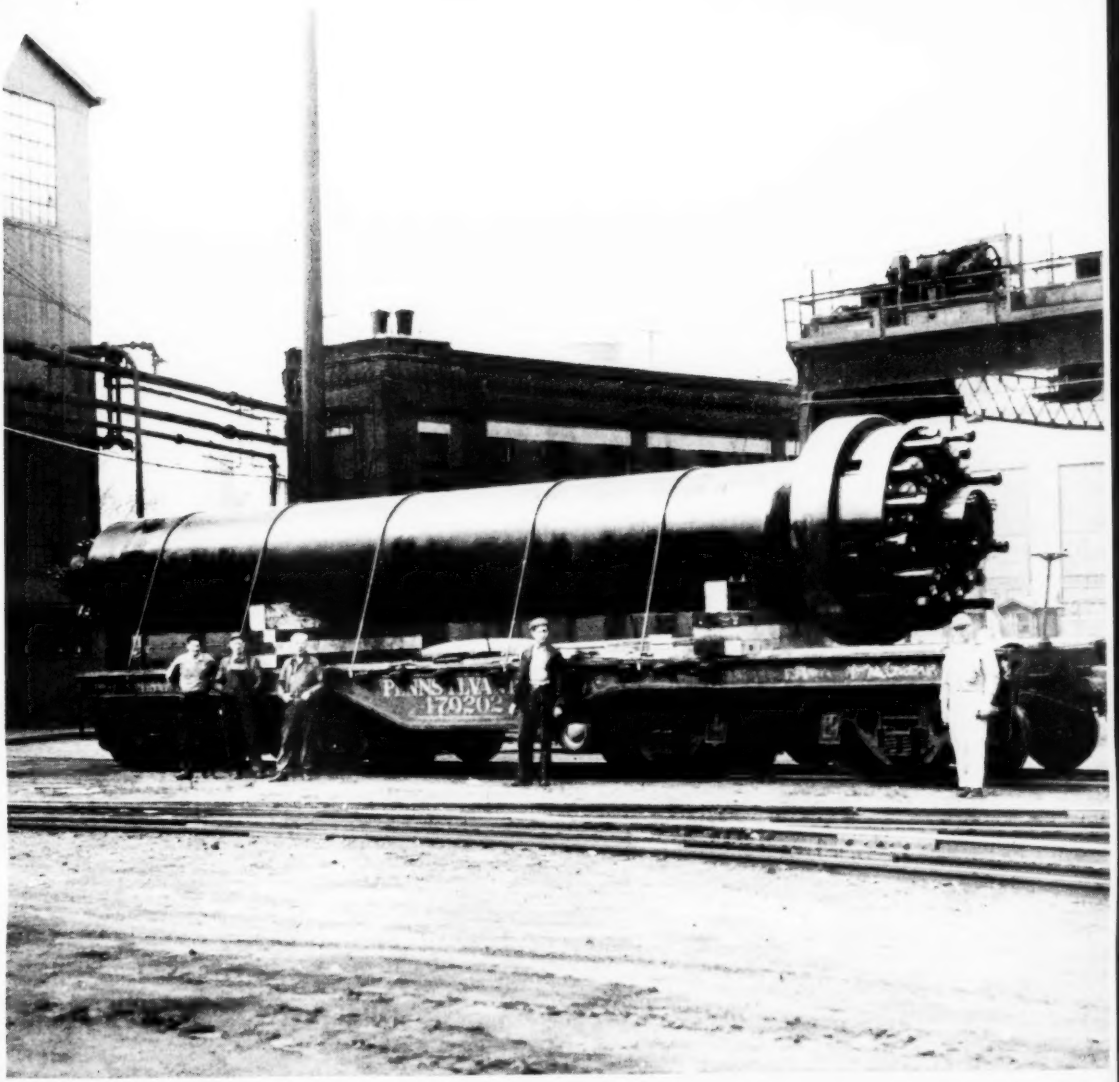
MIDWEST ENGINEER

WESTERN SOCIETY OF ENGINEERS
FOUNDED 1869



NO. 6

1869 1949

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COVER CREDIT

The cover photograph shows a one-piece forged pressure vessel, such as is used in oil refining, chemical, and process industries. This forging, of chrome vanadium steel, was machined on all surfaces and pressure tested. Weighing approximately 550,000 pounds, it is the largest one-piece hollow forged pressure vessel ever made by The Midvale Company, Nicetown, Philadelphia, and is believed to be the largest of this type that has ever been made. Photo, courtesy The Midvale Company.

COMING IN THE MARCH ISSUE:

TECHNICAL IMPROVEMENTS AND EMPLOYMENT

GRIEVANCE PROCEDURE

CONSTRUCTION OF DETROIT'S EXPRESSWAYS

Letters

TO THE EDITOR

MIDWEST ENGINEER welcomes contributions for this column, whether comments, criticism, or opinions.

Engineering Societies Personnel Service, Inc.
84 East Randolph Street
Telephone ST ate 2—2748

I have observed with considerable interest the effect of ESPS advertising in MIDWEST ENGINEER. Because the results have been most gratifying, I think it only fair that the information be conveyed to you and your associates on this new magazine.

The responses from employers and employee engineers alike have been enthusiastic and not only from Chicago but from as far out as Utah, Winnipeg, Canada, Kansas and St. Louis. I know that all of you will be pleased to learn that we have satisfied the requirements of employers and placed engineers in positions as a direct result of ESPS advertising in MIDWEST ENGINEER.

Very truly yours,
JOSEPH R. DECKER, *Manager*

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of Philadelphia
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Administrative Department

"We have been looking over a copy of that most interesting and effective magazine, MIDWEST ENGINEER, of which you are the Executive Editor.

"You have done a splendid job, and we congratulate you. It was good of you to remember us, and in acknowledging your courtesy may we wish you all the best and hope that things will go well with you. . . ."

Cordially yours,
CHARLES M. TAYLOR

Edward A. Egan Industrial Relations Associates
120 S. La Salle Street
Chicago 3, Ill.

The two copies of MIDWEST ENGINEER you sent me demonstrated that you are doing a high-calibered job for the Society. The format of the magazine is attractive and its contents substantial and absorbingly readable. The quality of the magazine at this early date augurs well for better and clearer things to come . . .

EDWARD A. EGAN

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To the Development Committee: I desire to contribute the sum of $_____ toward the expense to be incurred in the development of the Western Society Headquarters, 84 East Randolph Street. My contribution will be:

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Putting the Squeeze On the Love Apple

THE STORY OF TOMATO JUICE

J. P. Rutledge
Stokely Foods, Inc.

The production of tomato juice—sounds simple, doesn't it? Yet before that can is ready for your neighborhood grocer's shelf, there has been considerable time, labor and money spent in the production of approximately 25 million cases per year.

First of all consider the tomato itself. Seed breeding has been practiced for many years in an effort to develop the tomato best suited for juice. In order to be a very good variety for tomato juice, the fruit should have a high red color, a rich flavor and a high total acidity. The ratio of sugar content to total acidity is the basic factor for good flavor. This tomato should also be of a juicy texture rather than mealy.

Stokely-Van Camp uses two varieties developed by themselves, and also the so-called Indiana Baltimore. In some localities these varieties may not be as desirable as others and the variety used will vary with growing conditions. When the best juice tomatoes for local conditions have been determined, it must be seen that they are picked at the peak of perfection. An underripe tomato is poor in both color and flavor and, likewise, overripe fruit is particularly poor in flavor. As the tomato matures on the vine, the sugar acid ratio steadily changes. Since this ratio is the major flavor factor, the tomatoes must be picked and brought to the factory at the right time so as to capitalize on the efforts of the seed breeders.

Depending on the particular factory, the method of handling may vary somewhat but the use of a water conveyor or flume is quite satisfactory since it is relatively gentle in action and serves as a preliminary washer. From the flume the tomatoes go to a tank type washer, being fed at one end from the flume and removed at the other by an inclined conveyor. The tumbling action accompanied with high pressure water sprays gives the tomatoes the final wash before scalding. The scalder may be either a hot water or steam type, the former in most cases. The function of a scalding operation is to loosen skins and partially soften the fruit. Since the tomatoes are to be trimmed and inspected, scalding makes this job more effective. In order that inspection and trimming may be an efficient operation, and since it is done by hand, the conveyor belt, on which the tomatoes are spread, must be of sufficient width and should travel at a speed so that every tomato may be inspected and trimmed if necessary. Generally, most operations handle 15 tons of tomatoes per hour per line.

In most tomato juice operations the fruit is chopped or broken in some manner prior to the actual juice extraction. This breaking, as it is referred to, may be performed either hot or cold. There are advantages and disadvantages to each system. If the "cold break" or chopper is used, it is followed by a preheater through which the product passes before going to the juice extractor. Two basic types of juice extractors are available, both of which force the tomatoes through a fine perforated screen. In one type the juice is extracted by a large spiral closely fitting the inside of a perforated screen. The depth of the spiral groove varies from deep, at the inlet end, to shallow at the discharge end. The volume taken in is then reduced at discharge so that the juice is pressed out through the screen. The perforation of this screen will be between .020 and .023 inches. Only the pure juice passes through the screen, the skins, etc., being discharged at the shallow end of the spiral. The second type employs revolving rollers on the inside of a perforated screen.

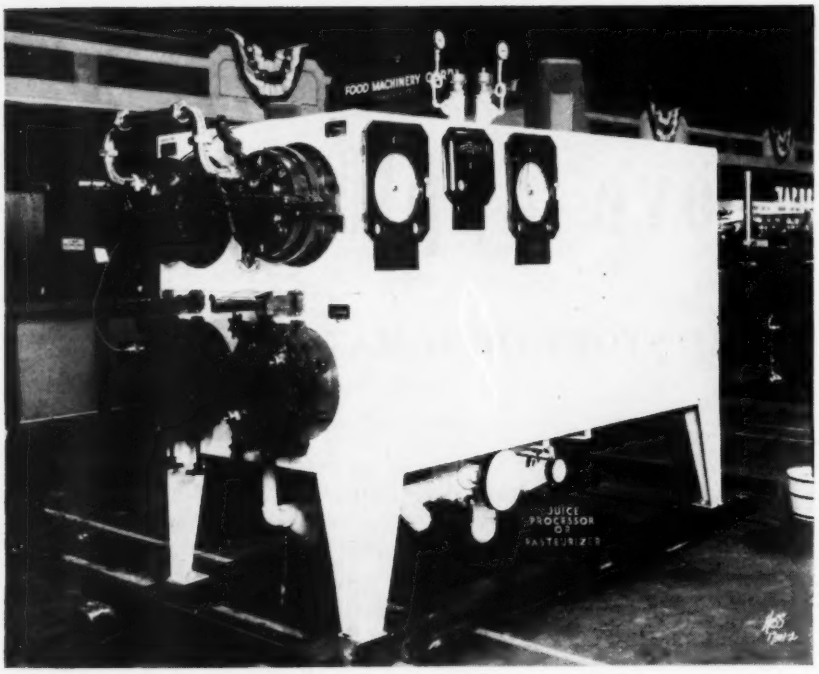
Of the two types of extractors available, the decision as to which one is to be used is largely a matter of individual choice. It is in the extractor, however, that the screen size and speed of the machine must be controlled to produce the desired viscosity of the finished juice. Since speed and screen size will control the amount and size of the tomato fiber in the juice, it may be approximated that the viscosity varies directly as the speed, all other conditions being constant. It is often necessary to change speed from time to time to produce a uniform juice viscosity.

As in the processing of most any food product, considerable time, effort and money can be destroyed by poor cooking or pasteurizing. For this reason the pasteurizer may be considered the heart of the tomato juice process, for on this operation depends the possibility of spoilage of the finished product.

The pasteurizer consists essentially of four tubular heat exchangers, namely the preheater, pasteurizer, holder, and cooler, each of which will be discussed with its control system. If a "cold breaking" system is employed, the preheater is used to heat the product ahead of the extractor, and the juice flows thence to the surge tanks, where it is salted, before going to the pasteurizer.

Instrument No. 1 on the pasteurizer flow sheet is a direct acting, indicating pressure controller, the purpose of which is to maintain a constant steam supply pressure to the unit. Instrument No. 2 is of the reverse acting, indicating type, and by controlling steam flow

(*Continued on Page* 4)



Juice Pasteurizer, courtesy of Food Machinery and Chemical Corporation, San Jose, California.

(*Continued from Page* 3)

through valve No. 6, the preheater discharge temperature is held at approximately 190° F. Having been salted and held in the surge tanks, the juice is then pumped at 30 gpm. to the pasteurizer where the temperature is quickly raised to approximately 265° F. As will be noted in the pasteurizer control diagram, instrument No. 3 is a double duty recorder with two temperature bulbs. The bulb, located in the pasteurizer discharge, records the temperature and controls steam flow through valve No. 7. To maintain complete sterilization and have a margin of safety, 30 seconds at 265° F. is considered satisfactory. The holding section is necessary to maintain a 30 second supply and the thermometer bulb, located in the holding section discharge, records this temperature also on instrument No. 3. From the holding tubes the juice passes to the cooling section where the temperature is dropped to approximately 200° F. Instrument No. 4 controls two functions. By recording the discharge temperature of the cooler, it controls both the cooling water supply through valve No. 8 and the flow diversion valve No. 9. In the event the juice is not properly pasteurized, valve No. 9 diverts the flow back to the supply tank, thus insuring that the filling machines receive no under-sterilized products.

Filling machines are of the rotary type with 12 to 18 stations, the number depending on can size and desired output per minute. Having been filled at 200° F., the cans then travel to the closing machine where the lids are tightly sealed.

Of all canned food available to the consumer today, it is agreed that citrus juices and tomato juice are the best sources of vitamin C. The canning industry is extremely interested in obtaining efficient retention of this important vitamin. Several factors have been discovered by chemists that must receive serious attention when equipment design and plant layout are to be considered. As an outgrowth of this information, engineers must avoid the use of copper and its alloys where they may come in contact with the juice. The exclusion of air also presents a problem since in the presence of air at temperatures above 150° F, the rate of decomposition of ascorbic acid increases tremendously. Equipment must be as near air tight as possible and packing gland seals, etc., should be checked periodically for tightness.

Before going to the cooler, the filled and sealed cans should be held at least three minutes, after being inverted, to sterilize the can lid and prevent spoilage due to the possibilities of air borne bacteria during the filling operation.

It is generally agreed that prolonged heating of most any food product destroys both its flavor and color. It is for this reason that cooling of the cans must be as rapid and uniform as possible. In order that circulation within the can be uniform, it must be agitated so that the cooling can proceed at the utmost speed. To accomplish this end, the canning industry has developed what is referred to as a "spinner cooler". Its operation is much like the name implies —spins the can as it cools. This operation may be performed by rolling or conveying the cans along a track with cool water spraying on them continuously. Water flow and can travel is arranged so that heat transfer is essentially counter current flow. Although rate of cooling is an important factor, the final temperature of the can at the cooler discharge must also be controlled. If the temperature is too low, the water left on from the cooler will not dry and cans can neither be labeled nor stored properly in this condition. Therefore, a maximum and minimum discharge

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temperature is set for safe cooling but the container and its contents must still possess enough heat to evaporate the moisture on the outside in some reasonable period of time. This drying period may vary due to the handling arrangements between the spinner cooler and labeling machinery.

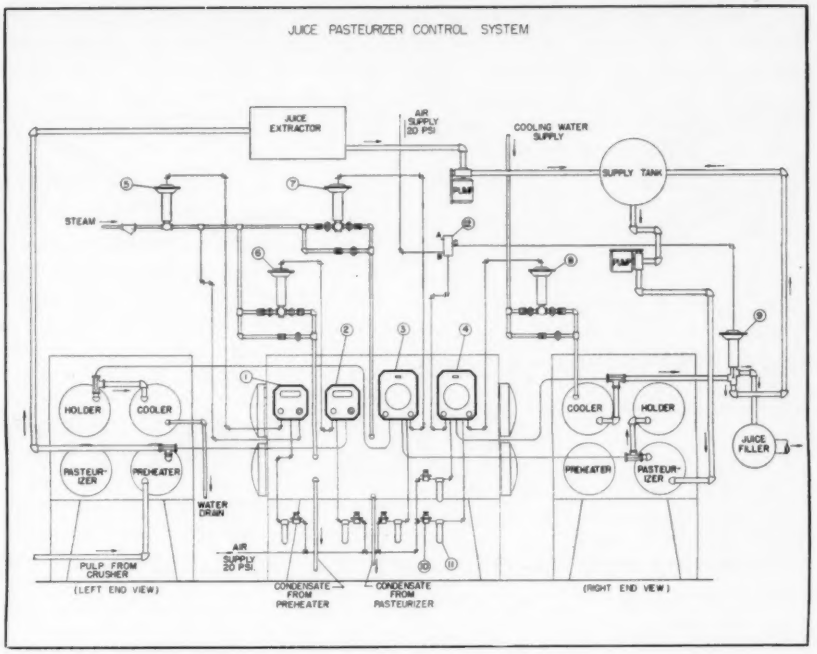
Considerable care is exercised in the labeling operations. Although shipping long distances sometimes is damaging to both case and label, everything possible is done to present a neat, clean, and attractive appearing package on the grocer's shelf. The advent of the "self service" market has demanded that merchandise catch the housewife's attention and speak for itself, since many women are merely shopping for a product and not a specific company's merchandise. If her attention is attracted, and the purchase is made, the contents of that can will determine whether or not she continues to purchase the Stokely label in the future.

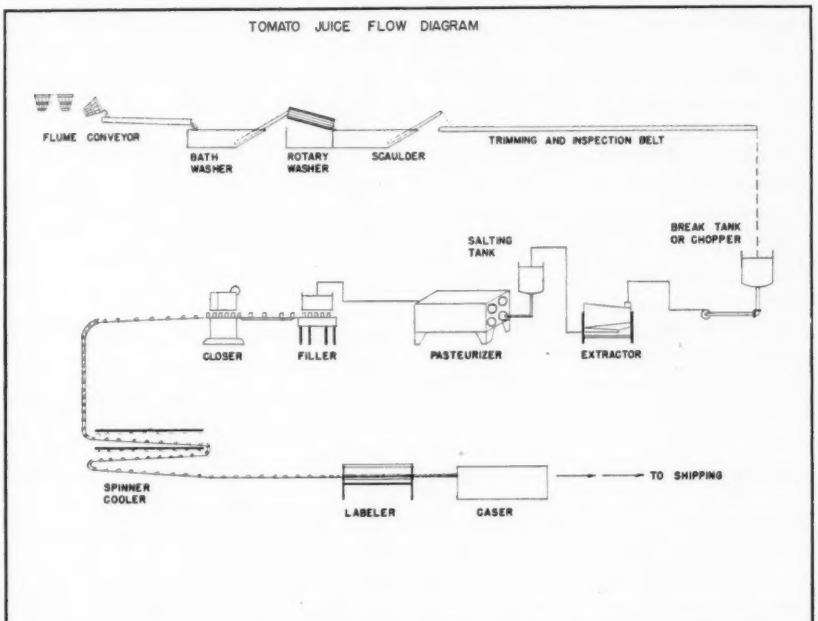
If she is completely satisfied with her purchase, it is very probable that many more of the 115 products of Stokely-Van Camp will find their way into her grocery basket.

Brains for Elevators

The electrical "brains" of electric elevators, already amazingly talented, now have another factor to consider in making their "judgments"—cable stretch. For all elevators close leveling at the floors is desirable. For freight elevators this is particularly necessary since heavy wheeled loads are often moved in and out. In some buildings the cables are long enough to stretch or shorten and let the car drop or rise an inch or two as a heavy truck enters or departs, possibly necessitating a releveling. Because the traction motor torque does not build up instantly, when the controller releases the brake to bring the car back into position the car may actually drop another inch or two or, if the load is light even rise a like amount.

A new control element, designed by Westinghouse, relevels the car automatically. A load weighing device and a control measures the load in the car and controls the release of the brake. For example, with a very heavy load the control would hold the brake on until the elevator motor had built up sufficient torque to relevel the car without further dropping; then it would release the brake and relevel.





Courtesy, Taylor Instrument Company

New Fiberglas Use Developed

Fiberglas cloth is being employed as a series cutout between the lead-in wires of Westinghouse gas-filled lamps used on the New York Subway where twenty lamps are operated in series on a 600 volt d-c circuit. The nominal operating voltage of each lamp is 30 volts.

By inserting the Fiberglas between the lead-in wires, the necessary critical spacing is maintained. A strap of nickel around the wires holds them tight against the Fiberglas.

By means of a quality control test devised by Westinghouse engineers, it is possible to check the breakdown characteristics of this type of cutout before it is sealed into the lamp without destroying its usefulness.

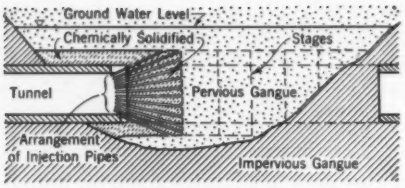


Figure 1

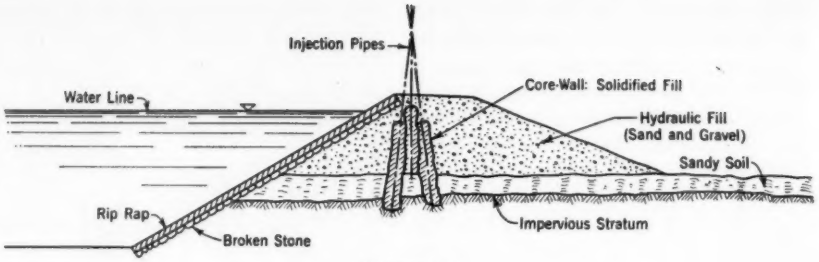


Figure 2

Latest Developments in SOIL SOLIDIFICATION

C. M. Riedel
Chemical Soil Solidification Company

Chemical solidification of loose, sandy soils, based on the Joosten Process, has in many instances considerably lessened the foundation and leakage problems of the engineer. Solidification can improve bearing conditions or stop the flow of ground water, and chemical grouting can stop difficult leakages in concrete structures.

This method of pressure injection of chemicals into the ground or through pre-drilled holes into concrete, masonry, brickwork or faulty layers of rock, has become an important auxiliary in the fields of construction and maintenance, of hydraulic and hydro-electric structures.

About 15 years ago, while searching for the most practical and economical type of a watertight retaining wall around the proposed South District Filtration Plant, Chicago (now in operation), the writer became interested in and was led to investigate relatively new discoveries to convert loose sandy layers into a watertight, stone-like, load-bearing material by saturation of the strata with chemical solutions. These studies developed into practical laboratory and field tests and finally into actual contracting work.

The process consists briefly of the consecutive injection of two aqueous solutions through heavy injection pipes into the pervious ground, usually in stages of 22 inches in depth, with a conservative radius of action of approximately 10 to 16 inches.

Chemical I, injected first, is a special silicate of soda solution (water glass) of a greater specific gravity than water, and of a Baumé-degree which depends on the conditions of the strata to be solidified. Chemical I must be followed, without much loss of time, by a reagent, Chemical II, either a gas, or a strong oalcium chloride solution. Upon contact, the reaction of Chemical I and Chemical II is instantaneous. The rock forming "firm silica gel", non-reversible in its character, forced by continuous pressure into the voids of the sandy soil, changes it without a period of setting, into a soft, sandstone-like, dense, watertight material. Ground water, stagnant or moving, is pushed ahead by the pumped-in Chemical I, which practically will not mix with water. The precipitating agent, Chemical II, when correctly applied, has such a strong affinity to Chemical I, together with the strong surface energy of the rapidly forming gel, that a uniform reaction in sandy soil takes place without fail, provided a carefully laid injection plan is rigidly followed, and that the two properly mixed chemicals were injected in the prescribed proportions.

Acid in the ground water or salt water tends only to accelerate the progressive formation of the silica gel, without any harm to the hardening process.

The pressure used while pumping in the chemicals will vary with the depth below grade and depends on the hydraulic characteristics of the natural layer (300 lbs. per sq. ft. is rarely reached in typical solidification work). Due to the specifically set amount of each of the quantities of the gel-forming agents, a high pressure is seldom expected, but when indicated by the gauges on the pumps, it would mean some trouble in the injection system.

The composition of the two chemicals required and the quantities given for the solidification of the material are determined in the laboratory where two or three representative samples of the soil from the site are treated in a special testing apparatus, after local and geological conditions have been checked and reports confirmed. The solidified samples obtained in the laboratory are likewise studied and subjected to compressive tests.

Characteristics

The hardness to be expected from solidified natural sandy layers can be compared with that of a soft to medium soft sandstone, varying between 250 psi and 1100 psi (or approximately between 20 and 80 tons per sq. ft.); in other words, more than sufficient to carry even highly concentrated straight column loads. It can be said that not too fine sand (less than 80 mesh), with a high silica and quartz content, without noticeable clay admixtures, will give the hardest, most desirable and economical solidification. Strangely, sand with rounded grains seems to pack better and will

produce a denser solidified mass. Sand up to a fineness of 120 (U.S.) mesh has been solidified with good results in work to stop persistent leakage of ground water into building pits.

Compression Tests

Before carrying out important and large scale solidification work in connection with the London (England) subway, main sewers and foundation improvements under private large buildings, John Mowlem & Co., Engineers & Constructors, London, SW3, made very careful investigations as to the characteristics of Joosten-solidified sandy soils. In their reports and in a paper by Sir Henry Japp, M. Inst. C.E., we find the following data which have been verified by the author's tests:

(1) Consolidated Thames River Ballast, containing 24% silt and clay, solidified in laboratory and tested 30 minutes after injection of the chemicals, crushed at 247 psi (—15.9 tons per sq. ft.). A second sample, same size (3 inches in diameter, 6 inches long) but two days old crushed at 19 tons per sq. ft.

(2) Leighton Buzzard Sand. 10 minutes after treatment crushed at 97 lbs. per sq. inch and 11 weeks later at 715 psi (46 tons per sq. ft.). Field samples of actual work carried out averaged 350 psi (22 tons per sq. ft.).

(3) Bending Tests. Besides these compression tests, a sample 6 in. by 4 in. by 36 in. long, was subjected to beam action (supports 18 inches apart). The sample broke under a center load of 840 lbs., representing a tensile stress of 157 lbs. per sq. inch.

Solubility Tests

Solubility tests were made by the author in his Chicago laboratory with samples of field-solidified material which has shown a compress strength of about 490 psi; also with a sample of natural sandstone (from an Illinois quarry) and a piece of plain concrete, 8 months old. All three samples, immersed for 48 hours in separate glass beakers in a 3% hydrochloric acid solution, showed almost identical very slow integration and loss of weight after being dried in an oven for 24 hours.

Therefore, any acid expected to be present in submerged natural layers of sandy soil, or in fill made up of slag obtained from steel mills, or salt water along coastal regions, will have no detrimental effect on solidified material, as experience over a period of 21 years has shown.

Limitations

As Dr. Hugo Joosten emphasizes, the limitations of the process should be well understood in order to avoid disappointments or unsatisfactory results. The process, even in its improved form and using more adequate equipment, is not a cure-all for all foundation difficulties and is in no way intended to be a competitor to concrete or steel sheet piling, etc. Wherever concrete or steel sheet piling can be used to obtain desired results, they should be selected for the job because, in many cases, this will be more economical. Solidification of the natural material should be considered where the limitations of concrete or steel are reached, or in cases where time is the deciding factor in completing a certain emergency job, or in the event steel sheet piling cannot be obtained. Clay, silt or finest sand of 150 mesh or more is generally considered to be unsuitable for solidification work. Here the electro-chemical process after Dr. Casagrande, comes into its own. This process, its development delayed by the war, still is in its infancy and also awaits further research before it can have widespread use.

Applications

The field of application reaches practically into every phase of construction and maintenance work: heavy foundation, sewage and water works, structured, railroad, tunneling and mining (Fig. 1), river and harbor work, hydro-electric developments (including dams and reservoirs Fig. 2), anchorage of high concrete retaining walls, of telephone poles and high-tension masts, etc. We are still confronted with new problems where chemical solidification would bring a satisfactory answer. Inquiries and requests for advice are received from many parts of the world, indicating promising possibilities which seem to be untouched as yet by serious investigation and research.

The more common work in soil solidification includes: (1) underpinning of walls and column footings without excavation (Fig. 3 and Fig. 4), stabilizing and strengthening the sub-soil for greater bearing capacity; repairing slabs and stabilizing sub-soil under existing airport runways and parking-aprons at plane loading zones, against damage from impact and long periods of vibration; creating or forming protective curtain walls around existing clusters or rows of pile-foundations near deep street excavations for sewers, watermains, subways. (Noted work by Dr. Joosten in Europe includes underpinning of the ancient and historical Queen Anne's Alcove in London; in Italy, solidification under the Leaning Tower of Pisa; in Greece, solidification under the famous Temple of Parthenon, Acropolis, Athens, stabilization of a layer of quicksand in greater depth under a large apartment building.)

Besides the chemical sealing and rejuvenating of deteriorated concrete dams, a number of unusual jobs have been carried out, stopping difficult leaks against a considerable hydraulic head and waterproofing utility tunnels (Fig. 5), observation galleries, high retaining walls of pump or boiler rooms in steel mills and power plants, thin-walled prestressed concrete tanks (Fig. 6). Another application was the sealing of a 19 ft. 5 in. long vertical crack clear through the 22 inch wall of a large clear-water reservoir. In this case, the concrete was poured only a few weeks before and the reservoir was not yet in use. The crack apparently was caused by shifting or settling of the form work. Only five

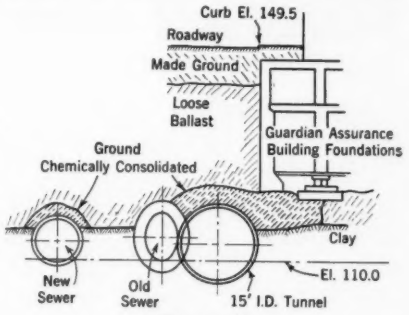


Figure 3

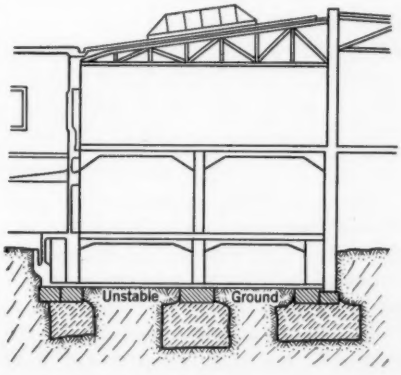


Figure 4

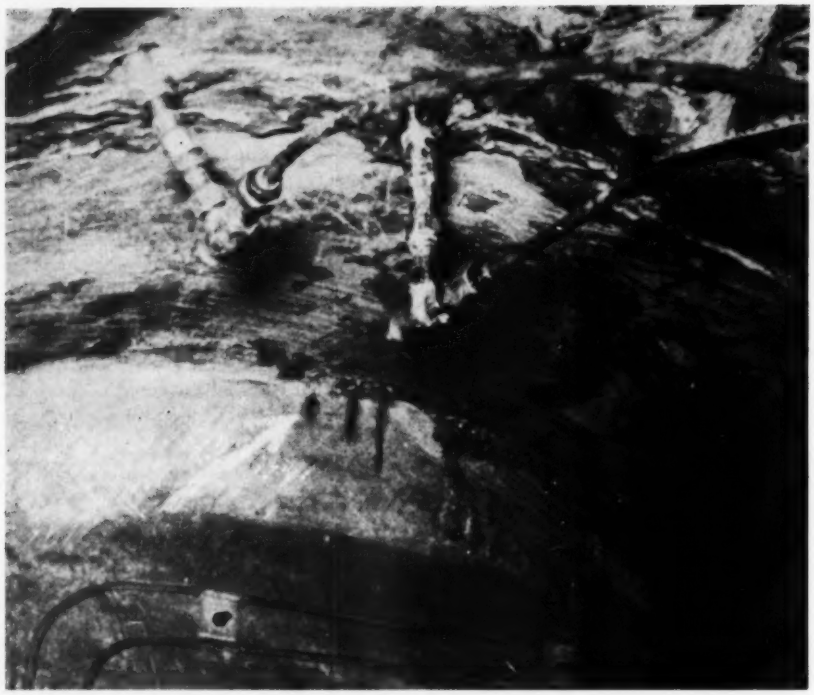


Figure 5

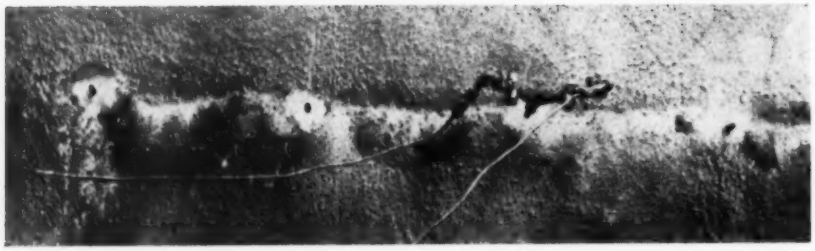


Figure 6

(Continued from Page 7)

injection holes halfway through the wall, intersecting the crack, were used to make the wall watertight by forcing the quick-setting gel into the irregular void. Immediately after the injection was completed, a powerful stream of water through a firehose was played against the outer face of the wall for about 8 hours without any wetting of the inside of the reservoir.

There is a wide field before us for further research and studies of applications of the process to solve many other engineering problems. Foremost in the mind of the writer is the sealing of inactive or abandoned bituminous coal mines in order to stop the alarming pollution of streams by acid drainage discharges, work which already was well under way before the war.

Another possibility is the shallow solidification of soil to form a solid base for concrete landing strips and runways of airfields. Research in this direction would, without doubt, lead to other uses, for instance, in highway construction in desert regions, and the preparation of road-beds in railroad work where unstable, quicksand-like natural layers of sub-soil will not permit conventional road-bed construction.

Still another field of application which might influence, in a certain way, the newest and deepest research, that in nuclear science, is soil solidification as a means of forming an effective and economical insulation, replacing, for example, heavy lead wall-plates as curtain walls, top shields and aprons around, above and below atomic research laboratories, bomb shelters and waste storage structures.

Conclusion

While the progress made to date is most encouraging, a stage has now been reached in soil solidification pioneering, where the ever increasing burden of specialized research work must be taken off the shoulders of the few who have privately, and with great sacrifices, carried on, often with limited tools and equipment. Research work of the proper proportions, in well-equipped laboratories, will result in ultimate standardized procedures and equipment. This will bring down the cost of field work from its rather high level to within the reach of a great many new users. All who are interested in time- and material-saving methods in construction and maintenance work should take real steps forward in the promising field of soil solidification which Dr. Joosten has opened. It is a field which reaches from chemistry, into geology, soil mechanics, metallurgy, electro-chemistry, physics, and hydraulics. With bold vision, we must coordinate our efforts. We must have the help and cooperation of specialists in these sciences. This country is now engaged in a staggering volume of construction activities. Systematic research, supported by powerful engineering and construction organizations, will save valuable time and create immense opportunities to serve in critical times of need.

The postage rate on domestic air mail letters (not over 8 ounces) and those for Canada and Mexico was increased to 6 cents for each ounce or fraction thereof on January 1, 1949.

From 1500 to 2000 letters daily, intended for air mail, are posted in Chicago with insufficient postage which indicates that our patrons have not observed the new rate.

The matter is therefore again brought to attention in order that the people in Chicago may avoid delay and inconvenience resulting from carelessness or lack of information in this matter.

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Cooperative Education

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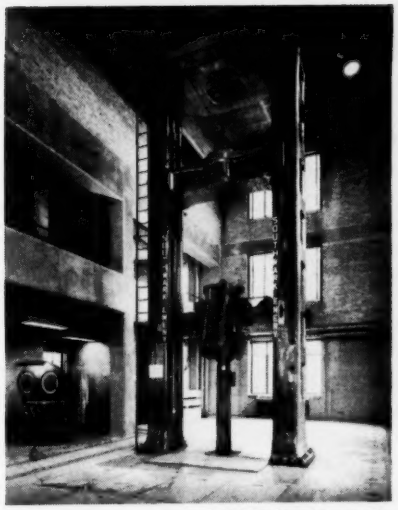

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The engineering profession endows its members with a deep social and moral responsibility. The engineer must satisfy the demands of society for an ever-increasing standard of living, using the researches of pure science to produce, through industry, human benefits. In order to undertake successfully such a task, a man who would class himself as an engineer must understand: (a) the scientific method of thought and the natural laws of science, (b) the organization and ethics of industry. Industry and commerce characterize much of American culture. By their proper union with education, even greater achievements than in the past may be expected.

With this basic philosophy in mind, the cooperative system of engineering education has been adopted as part of a required curriculum at Northwestern University's Technological Institute. The Institute, founded at Northwestern University in 1939, is an expression of Mr. Walter P. Murphy's belief in the advantages of this dualism in engineering education. In his will, Mr. Murphy wrote,

"It is my express desire that this Technological Institute become second to none in America, and the bequest herein provided for is made for the purpose of enabling the trustees of Northwestern University to carry out my wishes in this respect."

Following Mr. Murphy's views, the Institute is a cooperative venture: internally, it involves the coordination of instruction of engineering with science and commerce and with other educational departments of the University; externally, it cooperates with industry in providing a maturing and stimulating experience concurrent with instruction. As Mr. Charles F. Kettering, vice president of General Motors, has said, "If the plan is analyzed in terms of engineering, it is an attempt to lap-weld the boy onto industry instead of butt-wielding him."

Our students take a five-year course leading to the degree of Bachelor of Science in Chemical, Civil, Electrical, Industrial, or Mechanical Engineering. The first year and two quarters of the second year are spent entirely in college. Then a program of alternation between college and an industrial job is started. This is on a three-months' basis, and during his periods in industry, the student works just as any regular employee of the company; that is, he is completely away from the school and, of course, has no class work. In this way the student is provided with a certain amount of practical contact with industrial procedure and methods, and the company is enabled to bring men along in its organization who often become valuable permanent employees after graduation from Northwestern. This intermittent work-school program continues on a year-round basis until graduation.

Usually the students work in pairs; that is, while one man is in school the other man is in industry, so that one job in the cooperating company is maintained continuously by two students alternating on the quarterly basis. In general, it is anticipated that cooperative students will remain with the same company throughout their college career, getting a reasonably diversified experience. The rate of pay is left entirely to the company's discretion, but is usually the same amount as is paid to other employees doing the same type of work.

Location of the job is often an important factor with the student. Frequently he prefers to work in his home town. If the city in which he lives is large enough or sufficiently industrialized to provide work which is related to the student's course, then a relationship may possibly be established with a company within commuting distance of his home. Although the jobs which cooperative students occupy in industry range in quality and responsibility from bench work to department supervision, there is one feature common to the training of all men upon which the Institute insists: that a student going to work with a particular organization shall have a well-diversified experience throughout his six industrial assignments. The discipline and habit-forming functions of regular employment in industry contribute at an early age to the subsequent accumulation of factual knowledge and the development of an alert and well-conditioned mind.

The value of an educational process is not to be measured alone by the quantity of information which it imparts, but also by the flexibility and versatility which it develops. The vital requisite is a disciplined mind with the perspective, the judgment, and the ingenuity necessary to derive the greatest possible value from the information available. Consequently, it is of the greatest importance, especially at the beginning, that the most strenuous efforts be devoted to creating a facility for clear and logical thinking. Since a college course constitutes such a beginning, its primary objectives should be the proper orientation of the student's

(*Continued on Page* 10)

Cooperative Education

(*Continued from Page 9*)

point of view and the conditioning of his mental processes. Subsequent accumulation of factual knowledge is accomplished much more easily and effectively by a well co-ordinated mind.

Ovid W. Eshbach, dean of the Technological Institute, in a speech commemorating the fiftieth anniversary of the cooperative system remarked: "We are, perhaps, too prone to think of engineering education as education about things. No education is complete without an education about people. Cooperative courses teach students to get along with people and to appreciate the personal problems of various social and economic groups. This is important as the complexity of our society increases. Cooperative education puts the emphasis on what we *don't* know, as well as on what we *do* know. It promotes a questioning mind along with a close relationship with modern industrial practice. Students hunt for information rather than depending upon someone else to organize it for them. These are qualities which promote maturity, emotional stability, sound judgment, and courage."

Must Submit Report

A student is required to submit a written report to the Department of Industrial Relations after the completion of each period of cooperative work. This report is based on the student's activities and observations while on the job, and serves as an incentive to get the maximum value from contact with practical methods in industry. The report must be submitted not later than one month after the beginning of the quarter in scholastic residence following the completion of the cooperative period. If the employer so desires, a work report may be submitted to him for approval before being turned in to the school. Anything confidential may be deleted from the report.

The Department of Industrial Relations secures a rating on each student from the employer. The student is graded by the employer on such characteristics as interest, application, ability to learn, self-reliance, accuracy, speed, reliability, initiative, judgment, and general conduct. In order to receive credit for a quarter of cooperative work, a student must earn a passing grade on his written report and receive a satisfactory rating from his employer. Subsequent placement is influenced by these two factors.

Hedrich-Blessing Studio

Heat Power Laboratory in the Department of Mechanical Engineering, Northwestern Technological Institute.

The following is a quotation from a concluding paragraph of a work report recently handed in by a student in chemical engineering after completing his first industrial assignment. "There can be little doubt as to whether the last period of cooperative work was profitable. In practical experience alone the value is more than can be measured. Then, too, one learns a bit about giving consideration to the other fellow, something we seem to forget in the pressure of our studies. But more than these, there is something gained which lies beyond that immediately apparent—that thing is a purpose. Education is mockery if we lose sight of the basic things for which it was intended. In my opinion, the cooperative system adds purpose to education."

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TALKING TO THE

Robert Newcomb & Marg Sammons,
Consultants in Employer-Employee Communication, Chicago

EDITOR'S NOTE: *The subject of employer-employee communication is commanding the interest of management everywhere, and the recent election has sharpened interest in it. In November Robert Newcomb and Marg Sammons, who comprise*

Last month a speaker at a management conference suffered an interruption.

He had been on the platform about forty minutes. During that interval he had underscored the high values of the rich and abundant life. He had extolled the virtues of the free enterprise system, holding it second to none. He had urged his listeners, finally, to establish stronger communication between employer and employee.

The intruder who lumbered to his feet tagged the speaker with one word: "How?"

Now, all of the readers of this magazine are in accord as to the merits of the American system. We are in complete agreement, we are sure, as to the necessity for strengthening the bond between management and employee. There is probably no theme in recent years that has undergone such thorough treatment on lecture platforms.

It has been customary for the critics to indict management for its failure to act, and we agree that management has lagged badly in many instances. But our experience has also shown us that, while management often is in doubt as to procedures, it is perfectly willing and sometimes even eager to listen.

Interpret Company

As we see it, the objective of any communications program from management to employee is to interpret the company, its economics, its operations, its problems, its personnel, in order to develop employee interest, understanding, cooperation and loyalty. To put it simply, the objective is to build a good team, in the plant itself, in the home, in the community, in the consciousness of the employee.

These, briefly, are the means at hand —the recognized media of employer-employee communication. We're thoroughly aware that we are addressing an audience fully aware of these media, but let's try to build a platform all of us can stand on!

First, the employee publication or "house organ." This is the medium that interprets the company, in simple, understandable terms to the employee. It is the journal which, localized wherever possible to the employee's interests and concerns, tells the story of the company's progress, its operations, the sources of its raw materials, and the end uses of its products, with legitimate news items about the personnel. It is modern because the tastes of the reader are modern; it is pictorial because this is a picture era. It tells its story in terms of identified employees on the job, because that's the way employees understand it most readily.

Second, the plant bulletin board. This is the great, neglected medium that helps to link the employee to his company by daily, on-the-job contacts; a supplement to rather than a substitute for the employee publication, it reports the news essentially of in-plant interest.

Third, the informational manual or handbook. This is the medium created principally for new employees, but of use and value to those already in service. Normally pocket-size, simple and pictorial, its essential purpose is to help the new employee familiarize himself with his surroundings, to feel welcome there, and to know the regulations that necessarily govern any plant.

Fourth, the employee annual report. This is obviously the account of management's stewardship at the end of the fiscal year. It doesn't seem to call for any further description; you people are all familiar with it.

Contacts Important

As we see it, all the others are variations of these; all have the same basic purpose—the payroll envelope insert, the moving picture and slide film, the public address system, the executive newsletter to employees and the supervisor's report. The greatest medium of communication, however, is still the person-to-person meeting between the boss and the employee. It sounds like heresy for a pair of consultants to say it, but if management has good person-to-person contacts straight down the line, media of communication don't need to worry the boss very much.

We are going to assume that all of you have had plenty of empty talk about the free enterprise system, so we are going to tear up about fifteen pages of manuscript. We know that you will agree with us when we say, "What are we going to do about it?" Let's get down to cases and answer that guy who asked "How?"

Must Have Objectives

First, let us make a general observation about media of employer-employee communication:

We think the time is at hand when these media must work against measurable objectives. To us, that means just this: Any communications device should be built for a specific, measurable purpose. Then the medium should be pitched to do the job assigned to it. And finally, it ought to be checked to see how well it's done the job.

This, then, is a sort of blow-by-blow report of three media of communication working against specific, measurable objectives. The media we have chosen are the informational manual for new employees, the employee publication. and the plant bulletin board. The manual was produced for one company; the employee publication and bulletin board program developed for another.

Let's take the plant first, where the informational manual was done. It is located in a typical manufacturing city, where the company produces heavy equipment for industry. It employs about 1500 people, mostly men.

When the company management discussed the informational manual, they were pretty general, saying, "We want to get out a sort of a book of rules."

After quite a few huddles, this is what we came up with, and with it the in-

EMPLOYEE

the man-and-wife consulting firm of Newcomb & Sammons, Chicago, jointly gave this talk before the personnel section of the Delaware State Chamber of Commerce in Wilmington. Many of the points made are of pertinent interest to our own readers.

dications of what was measurable and what wasn't. Here they are:

(1) To provide new employees with a manual of information about the company, particularly the rules and regulations. Regular employees would also receive it so that they too would be informed. We figured it was possible to measure, however roughly, on the basis of a decrease in plant rules violations. If the violations increase or remained the same, chalk up a zero for the manual. If they declined, the manual would share the credit.

(2) To orient the new employee to his surroundings by telling him something about the company, its various departments, products, personnel and so on. A little hard to measure, we figured, but an objective we wanted to keep very much in mind.

(3) To attract to the plant, located in a highly competitive labor area, good employees in fair quantities. We figured we must be able to show that any increase could be traced to the manual.

(4) To try to cut down costly job separations after only a week or so of work. Turnover was high all through the area. Measurable? We said yes, with reservations. We could watch the people who came to the plant because of the manual and see how long they stayed. There were economic factors involved, too, but we put it down as a measurable objective.

(5) Using it as an external mailing piece to certain customers and prospects, to foster good customer relationships. Measurable or not? To some extent; you would have to depend on word-of-mouth comments and fan mail.

(6) To develop a better spirit around the plant itself, among the employees. We made a note to check the foremen for any improvement here.

There were others, but these were the main ones.

We wanted a tailor-made job. We think every plant has an individuality, and that's what we wanted to capture. We used a novel device in this manual —the combination of the photograph and a humorous figure we called Joe. The manual is called "The Story of Joe" —not the "Rules and Regulations of the X Company" or something equally stuffy. You even have to open the manual to find who published it, what company it is.

Because we know heavy technical descriptions of operations are bewildering, especially to a new employee, we kept the language easy to understand. We know only too well that the average employee isn't going to read great blocks of dull copy, so we keep it brief.

The Story of Joe

The 36-page Story of Joe was given to each employee, with his name on it, by his supervisor. The supervisors were in the act from the beginning, and the union officers cooperated as well.

How did it stack up against the agreed measurable objectives? It's not a complete nor is it a perfect score, but it's done some things. This report is not from us, it's from the company itself.

First, violations of plant rules started to decline shortly after the manual was issued.

Second, while the difficulty of measuring it was admitted at the outset, the manual appears to have helped a great deal to orient new employees to the company.

Third, it has attracted a higher type of applicant to the plant, in sufficient numbers to ease a bad labor shortage.

Fourth, the new employees are staying longer, seem to be more satisfied.

Fifth, the manual definitely aided customer and prospect relationships. The management is satisfied on this point.

Sixth, every evidence points to an improved spirit among the plant employees. The foremen all reported that the manual had improved plant morale.

The verdict, then, is partially in. To the management that footed the bill, it looks most favorable. In getting and holding new employees, it rang the bell.

A second program, built against measurable objectives, is making strides at a nearby foundry. In the interest of saving your time, we can pass over the obvious objectives, which will reveal themselves as we go along anyway.

Bulletin Boards

For some time we have been saying to management that it overlooks a bet when it overlooks its bulletin boards as a means of communicating with employees. It is the best single medium we know of where messages can be gotten over fast, at little cost.

When we moved into this plant of approximately 1000 employees, the plant bulletin boards were in a state of neglect. The notices were old, the boards in bad repair. We checked employee interest and found it negligible.

These new boards come in pairs. Initially there were five sets in key positions in the plant and office; now there are eight. These locations were chosen after we checked the traffic; you want your boards near, but not in areas of congestion. You want your boards to be vivid, colorful, eye-catching. You don't want much copy.

On the left-hand side, we introduce the boards, by telling the employees what they are designed to do.

Below we show a group picture of the new members of the Year Club. All of them are identified, in an extra-large bulletin typewriter type we use especially for plant boards. Next, service anniversaries, each one noted promptly. These boards are changed every week, with timely material being put on as needed. The adjoining "News of the Week," is literally news—fresh, current, inviting.

We include an end-products story and an operations story. "Know Our Products" tells the story of a bolster

(*Continued on Page* 14)

Talking to the Employee

(*Continued from Page* 13)

made for a customer's tractor. And here is the picture-and-text story of the new pallet line, just going into operation. The text goes into some detail, to answer questions the employees are asking.

Is this a hard-and-fast formula? No, not at all. The bulletin board is a highly flexible medium. It adapts itself readily to the requirements of the news.

Against the obvious measurable objectives, what have these bulletin boards accomplished after only a few months?

First, it has established itself as a new, accepted medium of communication.

Second, it has created wide and interested discussion on operations and new products.

Third, it provides recognition of service records not publicized before.

Fourth, and now we're getting to the meat of the matter: The boards have proved their usefulness already in scotching a rumor that might have grown into a grievance. As soon as the rumor was heard in the plant, a notice went on the board. The rumor died fast.

These are two modernized media of communication—the informational manual and the plant bulletin board. We recommend them to you, in the light of what we know they can accomplish.

Of the assorted media of employer-employee communication that management has carpentered for itself, the employee publication or house organ is the most numerous. There are about 5000 of them and loose estimates put the annual bite at around fifty million dollars.

There's a new trend in industrial journalism, away from the Peeping Tom School of Journalism which eagerly reports the comings-and-goings of romantic plant workers. Progressive managements today are beginning to see eye to eye on the following points:

(1) The house organ is an interpreter of employer to employee and, to a modified extent, of employee to employer. It's the medium that defines, illustrates and explains the free enterprise system in its local plant or office applications.

(2) Like any company undertaking, the house organ must be planned in advance, so that management knows where and how it's headed.

(3) Communications media generally should be the final supervisory responsibility of an executive far up enough in the management brackets to know management policy and strong enough to say "yes" or "no."

(4) The editor should be a qualified person, not a pinch hitter.

(5) The publications must be budgeted liberally enough to permit them to do a job. They need not be costly, but that they should cost whatever is required to do the job consistently and well.

To create a post of vice president in charge of human relations, to utilize great pages of advertising to talk the American system and a company's contribution to it—these are half-measures of no enduring value. You still have before you the task of winning over the employee himself. Until the employee himself buys free enterprise, it's no sale. He isn't sold on it now, and any poll that says he is lends weight to a dangerous self-deception.

Publication Check List

We are not going to burden you with the techniques of modern industrial editing. But we'll give you a check list for yourselves and your managements. The list, we think might prove helpful:

(1) Is the publication actually a medium of communication between employer and employee, or only a recorder of gossip?
(2) Does publication announce, interpret and explain company policy and programs—or let employees find out through rumors?
(3) Does publication earnestly discuss the financial structure and operation of the company so that employees can understand? Or wait for union or public to demand answers?
(4) Based on sound editorial policy, planned in advance, or put together on a hit-or-miss basis?
(5) Is it modern in appearance and treatment, or does it fail to stand up with competition?
(6) Coordinated with sales and advertising, industrial and public relations departments? Or expected to go its own way?
(7) Is editor competent and experienced, given time to do his job well, and paid enough to encourage his best efforts?
(8) Does the publication make it a point to link the employee to his job, the job to the company, to the industry and to the democratic system? Or does the company blindly take the employee's love of the free enterprise system for granted?
(9) Has the publication been efficiently set up, with definite policies on budget, copy approval, jurisdiction?
(10) Is publication produced primarily to satisfy management, or are interests, tastes and concerns of employees taken into account?

We don't think we are by any means alone in suggesting that these are dangerous, uncertain times. We know we are right in our belief that all this vast talk about the beauties of the American system must sooner or later add up. We hope you share with us our feeling that, in some form, we must set these measurable objectives, and start achieving them.

As things stand now, you can mention the gathering clouds of war without being branded an alarmist. Military strategists are of the mind that this time, if war occurs, it will be for keeps. It may not be long before the workers of the country will be called upon once more to help defend the great citadel of free enterprise.

We'd better make sure they believe in it.

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How the New Draft Law Affects Your Company

A DISCUSSION BY

Colonel Paul G. Armstrong
Director of Selective Service
State of Illinois

Robert K. Salyers, Director
Bureau of Veterans Re-Employment Rights
U. S. Dept. of Labor, Washington, D. C.

Presented at a Business Problems School session of the Chicago Association of Commerce and Industry, and transcribed by the Lecture Reporting Division of the Monarch Printing and Publishing Company

Address by Colonel Paul G. Armstrong

I was chided a little by one of the representatives of the Association of Commerce because one of the newspapermen present here asked me, some days ago, what I was going to talk about on this occasion, and I said that I didn't think I would have much to say. I didn't mean it just the way he apparently took it. I meant because of the fact that this operation is so much different from the operation that we went through during World War II, that National Headquarters of Selective Service had not issued reams and reams of directives, as they did before; that they had issued very simple regulations to cover the occupational deferment policies of Selective Service during this operation.

Knowing sometime ago that I was to be invited over here, and to certain other groups, I wrote to General Hershey and asked him if he would give me further information relative to occupational deferment. He said that the regulations, as presently issued, were all that the National Headquarters intended to issue at this time, and that because of the scope of the operation, he felt that the local boards would take care of everything that was necessary, so far as occupational deferment was concerned.

Now I have found that most of the people to whom I have talked are laboring under the delusion that this is the same kind of an operation that we had in World War II.

We had, in World War II, 361 local boards; and presently there are 217 in the state. Our registration age group was from 21 to 35 at the start. That meant that a great many men in the upper age groups, had established for themselves positions of need and necessity within industry.

We of Selective Service had two functions. Primarily, it was our function to raise men for the armed forces of the United States. But in raising those forces, we had to recognize and did so recognize the fact that if we were to take young men from their homes and send them into the carnage of battle, it was necessary that we properly equip them with tanks and guns and airplanes and ships, and everything that goes to make up the necessary material of war.

We recognized the need for the deferment, temporarily, of men in industry; and we worked out, as a result, the replacement schedule program; and industry cooperated one hundred per cent

(*Continued on Page* 16)

Address by Robert K. Salyers

It is always a little difficult to engage in the art of prophecy in these days of tension. That seems to be a subject which you approach with a little trepidation, so I shall not attempt to prophesy what may happen to your industry or business under the new Draft Act, as far as the re-employment rights are concerned; but I shall try to briefly mention a few things that you may want to keep in mind as we enter this new phase.

I am going to touch briefly on three major points. First, the re-employment rights as a part of our national policy; second, in view of the main provisions of the Selective Service Act of 1948; and third, the importance of a preventive approach in handling this problem.

The guarantee of re-employment promised in the Selective Service Act of 1940, represented a new and significant device to accomplish the purpose of getting the ex-serviceman back into a civilian status. I sometimes think we do not realize how new and how significant it was.

First of all, up to that time nearly every readjustment device had involved some form of gratuity.

Second, it tended to get the veteran back, quickly, on a self-sustaining basis under the most favorable circumstances —on the job he knew, and among people who knew him.

Third, it is a very inexpensive device. For example, we have expended on the Serviceman's Readjustment Act, some three billion dollars, to take care of that group which could not return to jobs, or for some reason had difficulty in getting back on the job. Many more persons who were aided under the Readjustment Act, went quickly and easily back into the jobs, which they had held prior to entering service.

There is another angle to the guarantee of re-employment rights, particularly

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Address by Colonel Paul G. Armstrong

(*Continued from Page* 15)

with us. We had very few cases where employers misrepresented the actual facts in their places of business; and we were able to draft into the armed forces of the United States from the State of Illinois approximately 700,000. There were 918,000 men and women—total—who entered the military service from Illinois during World War II.

Our draft boards worked 40, 50 and 60 hours a week without compensation, trying to carry out their particular assignment under the Act of 1940. When the new law was passed in June 1948, industry began to think back over what had happened in that earlier operation, when in the age group between 21 and 35 we had taken a great many of their necessary men.

Now the age group that is liable for service under the new law, is the group 18 through 25. Everybody who has had certain kinds of military service is automatically deferred by law. Men with dependents cannot be taken this time—under regulations—and that means that married men who are living with their wives are not liable for induction.

Reason for Rejections

We have a very large list of previous 4-F's. I am sure most of you have noticed in the papers recently, stories of the tremendous loss of men on physical examination at the Army examination stations. The explanation of that seems to me to be this: We in Illinois under war-conditions, constantly examined and re-examined men who were rejected from service. Almost all of these men in the age group, 23, 24, and 25, that we have been examining now have previously been rejected from military service. Therefore, the loss necessarily must be high.

Let me tell you why I think General Hershey said to me in his letter that he thought with the limited calls that were placed upon Selective Service there would not be too much injury to industry through the taking of necessary men.

In the first place, we are in a peacetime economy, not a wartime economy. There is little or no industry today that is dedicated primarily to the manufacture of war material. True, these industries are planning and ready, if necessary, to change over again to a wartime economy; but they are not presently engaged in making war material. Therefore, there has thus far, first, been no instruction as to any particularly necessary industries; and certainly there has been no instruction received at my office that any particular occupation in that industry is a critically-needed occupation.

But that need not worry you, because let me tell you what actually has happened in the examinations we have held thus far of Chicago and Cook County registrants.

In the 25-year, the 24-year, and the 23-year-old groups, our registration figures indicate that 8.9 per cent of all the registrants in these three groups are single, non-dependent, non-veteran registrants. That is important—only 8.9 per cent, of all the registrants, 25, 24, and 23 years old, are single, without dependents, and non-veterans. That is the group that we have to depend upon for manpower for the service, through Selective Service.

Now we are recovering from that group approximately 15 per cent. That means, thus far, in physical examination, we have lost 85 per cent.

Well, what does that mean in a percentage figure of the total load?

It means that we are getting one and one-third per cent out of the three age groups 25, 24, and 23 years old—that is what we are netting. Obviously, if that is all we are netting out of all the calls, there isn't any particular injury going to be done to any industry in this area through filling the calls of Selective Service.

Essential Regulations

Now I should like to read to you that portion of the regulations that bears on the question of deferments, because of civilian occupations:

"622.9 Class II-A:—In Class II-A shall be placed any registrant whose employment in industry, or other occupation or employment, or whose continued service in an office (other than an office described in section 622.17) under the United States, or any State, Territory, or possession, or the District of Columbia, or whose activity in study, research, or medical, scientific, or other endeavors is found to be necessary to the maintenance of the national health, safety, or interests.

"622.10 Necessary Employment Defined:—(a) A registrant's employment in industry or other occupation, service in office, or activity in study, research, or medical, scientific, or other endeavors shall be considered to be necessary to the maintenance of the national health, safety, or interest only when all of the following conditions exist:

"(1) The registrant is, or but for a seasonal or temporary interruption would be, engaged in such activity;

"(2) The registrant cannot be replaced because of a shortage of persons with his qualifications or skill in such activity; and

"(3) The removal of the registrant would cause a material loss of effectiveness in such activity.

"(b) The President may, from time to time, (1) designate special categories of occupation, employment, or activity essential to the national health, safety, or interest; and 2) prescribe regulations governing the deferment of individual registrants engaged in such occupations, employments, or activities."

Small Percentage Now

Those are the essential regulations that cover the deferment of registrants under the present law. But I point out to you, again, that in the three upper age groups, where presumably there might be found individuals who are really essential to the national safety, health, and interest, in your industries, we are going to take only approximately one and one-third per cent of all the registrants in that category. That means that there will be left with your industries, veterans, men who are married or have dependents, and are therefore deferrable—and all of those who have been found disqualified for military service. Therefore, we can't do very much damage; and the local boards are going to consider those conditions, and the fact that they are going to take so few people from the community. I am afraid they are going to be rather strict in demanding evidence, first, that your industries or activities are essential; and second, that the individual whose deferment you seek is, himself, absolutely essential to such activity.

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Address by Robert K. Salyers

(*Continued from Page* 15)

after World War II, when it operated as a means of getting back employees who had the requisite experience —sometimes enhanced by their military experience and thus enabled us, in a time when the objective was to increase production, to get a source of effective manpower.

I think we missed a bet in the last war—those of us who had something to do with the demobilization of the military services—in not placing greater emphasis on the importance of the veteran's returning to his old job. I regret that, because by checks we have made, it is indicated that those veterans who did return to their old jobs are now in the upper half of their seniority rosters.

So, I think as a part of our governmental policy it is important for us to think of re-employment rights as citizens. and as businessmen, as well as those persons who may have something to do with it.

Provisions Similar

The Selective Service Act of 1948 contains in Section 9, the provisions relating to re-employment rights which are very similar to those of Section 8 of the original Selective Service Act of 1940. The main provisions are still in effect. The individual must have left a job other than temporary; he must have received a discharge under honorable conditions; and he must apply for reinstatement within 90 days following his discharge.

There are, however, a few changes worthy of attention. This time a disabled ex-serviceman, if unable to perform the duties of his old job, must be given one of like seniority status and pay, or the nearest approximation thereof.

I hope at this day and hour nobody asks me what the Congress meant by the "nearest approximation thereof." I anticipate we may have a little difficulty sometimes in figuring that one out.

Second, Congress has expressed a strong intent in this Act that the exserviceman be permitted to make up lost ground and be considered as having remained on the job while in service. That is not a mandatory provision, but it is a declaration of Congressional intent, which will probably strengthen the findings, with the Courts if there are any in the future on this Act, with respect to where that man gets back on the escalator;—the escalator principle, you know, was set up in the Supreme Court's decision in the Fishgold re-employment rights Case.

Third (and this is very important to an employer), there is a time limitation to new enlistments and on periods of service of Reservists called to active duty under this Act. It is provided now that a person who voluntarily enlists for a period not longer than (3) years is entitled to re-employment rights. If his enlistment period is voluntarily extended beyond (3) years he waives his rights to re-employment. Furthermore, any person enlisting for a second enlistment under this Act waives his rights.

We believe that the Congress intended that a 21-month inductee should be permitted to extend his enlistment period for not to exceed 15 months without a break in service and still retain his re-employment rights; and that a one-year enlistee should be permitted to extend his service for two more years, all without a break in service, and retain his rights. But these may not be new enlistments or re-enlistments, they must be extensions of current enlistments.

Reservists entering on active duty, regardless of whether they do so with or without their own consent, are covered by the re-employment provisions of the New Draft Act. In Section 9, Congress inserted the words, "in response to an order or call to active duty," and I give you what the Department of Justice people believe that means—even though a Reservist consents to being called back, he is covered —in his re-employment rights, if he serves for not longer than three years, unless he is held in against his will for a longer period.

Cooperation Necessary

The 1940 Act was successful because the employers, veterans' groups, and labor organizations pitched in to help make it work. The success of the new Act will depend upon the same thing.

We are trying to start now toward preventing some of the things that happened under the old acts. For example, General Hershey has cooperated with us, and the military services, by handing to each person who enters the Service now a very brief statement as to his re-employment rights. He is told to advise his employer that he is leaving to enter the military service, so that his personnel record may be kept up to date, and so that there may be no question as to what job he is to return to after he is out of the military service.

If you have any difficulty in resolving problems, you should contact our office here in Chicago, in Room 1200 in the Merchandise Mart. Mr. J. C. Fitzpatrick is available not only to assist veterans in the exercise of their rights, but to serve you if you have any questions regarding the interpretation of any provisions of the Selective Service Act.

There is one point that I want particularly to call your attention to, even though at the moment it does not exactly come within the purview of our operation. It is our opinion that the re-employment provisions do not accrue to a Reservist called to duty for a short period for training duty only, for example, for two weeks in the summers.

Reserve Situation

It is, however, our hope that employers, as they have in the past, will be very liberal in their attitude toward such tours of duty. It is essential to the national defense and to the expansion of the Reserve program. I would like to point out—that there is going to appear in this country something we haven't had in the past, and that is an increasingly large number of individuals who must maintain an active status in the Reserve. Each of these inductees or enlistees, and one-year enlistees, who leaves the Service, will have an obligation to maintain himself in the Reserve service for a period of years. That means you are going to accumulate, even in these younger age groups, an increasingly large number of persons who must take a certain amount of active duty training each year in order to maintain their status; and it is probably going to involve some rather complicated schedulings, and perhaps some cooperation with the military services with respect to the times and places that this active duty training is given or required.

The new Draft Act, as far as re-employment rights are concerned, may affect you more than you think—first,

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Address by Colonel Armstrong

(*Continued from Page* 16)

When we get into the 22-year-old group, the next group that we will enter, we will get a greater recovery. We will probably recover about 11 per cent in that particular age group.

Of the 21-year-old group, a few of these were examined for service in World War II. Many of them were in service, because they enlisted or because they were called and served the necessary one year, between September 16, 1940, and June 24, 1948—and are therefore deferred.

The 20-year-olds and the 19-year-olds cannot as yet be considered, and probably will not be considered by local boards as critical and essential in any particular industries. Personally I can't see where claim for deferment on an essential basis for a 19-year-old or a 20-year-old young man can be made to stand up.

I would say to you first, that there will be no special forms for deferment. At least we have not as yet received any, and instructions we have received, thus far, indicate that no such forms as we had in the other operation (42-A Specials, and 42-A's), will be utilized at this time. It is possible, if a more critical situation arises; God grant that such a condition may never come—but if such a condition should arise, then, of course all of these bets are off. Then most of you go into essential industries. Then the Local Boards will begin to take, once again, the veterans, without regard to previous service; Congress will pass an act taking care of dependency allotments, they will defer men with regard to dependency, but only those who are considered as hardship dependency cases.

If you really have a critical applicant, then you write a letter and cite to the local board exactly why the man is critical and essential in your industry; and send it to the local board and request their consideration.

You still have the right of appeal, if you have put in such a claim for deferment.

The regulations and the processes that are now in effect are very similar to those that were in effect in the other operation. In the event that you get into any difficulty and need any help, or want to know the answer to some particular or specific question, our office will be very glad to hear from you. We would rather have you write to us; and we will try to answer your questions in that connection as quickly as possible, and to the best of our ability. We are charged with the administration of a law that, in many ways, is most difficult to administer because it affects so many of our citizens. We are going to try, as we did before, to administer that law with every consideration being given to the needs of the nation and to the needs of the community.

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Address by Robert K. Salyers

(*Continued from Page* 17)

because the draft may be with us for a long time; second, because it may expand; third, because of the deferment provisions. A good many of those being drafted will leave jobs. We have made a few spot-checks on that, and we have found, in these older age groups of course, that a very large percentage of these younger people are leaving jobs.

Fourth, there is the probability of active duty for Reservists, which I have just mentioned; and the fact that the number of persons in the Reserve will rapidly increase all the time. So, that situation will probably stay with you.

We prefer to settle these problems by conciliation and agreement and clearing up of misunderstandings; We try to do that. Only a very, very small percentage of the claims we receive ever get into the courts. That is the way we want it, and with your help that is the way we can have it.

Franklin Thomas, Professor of Civil Engineering and Dean of Students at California Institute of Technology, Pasadena, has been named president of the American Society of Civil Engineers for 1949 in a mail ballot conducted among the organization's 24,000 members.

Midwest Power Show Scheduled

The Midwest Power Show, first major exposition of power engineering to be shown in the central west since 1937, will be resumed in 1949 at Chicago after a wartime lapse of more than 10 years.

Known officially as the 9th Midwest Engineering and Power Exposition, the show will be held November 11-16, inclusive, at Navy Pier, according to George E. Pfisterer, managing director, whose headquarters are at 308 West Washington Street.

As in preceding shows, which were held here annually from 1926 to '31 and biennially to '37, the 1949 exposition will emphasize all equipment made for power generation, distribution, and use. Special attention is also devoted to the safety factor in power operations, since the higher pressures and temperatures.

An advance prospectus which has just been distributed nationally to power equipment manufacturers already has attracted attention, with responses assuring a wide diversification of exhibitors.

"During World War II, tremendous advances were made in power generation," Pfisterer explained. "Now the municipalities and the industries that require new installations or replacements of power plants or equipment, are eager to see what is available, and are preparing to send their engineers to Chicago to view under one roof the most modern power generating equipment that war and post-war needs produced.

"The power plant equipment manufacturer is beginning to catch up with the great demand since the war, and is about ready to give early delivery in many items. This means that Chicago can again lead in the power field."

W. Fred Dolke, architect and engineer, has been nominated for the presidency of the Chicago Building Congress. Dolke at present is treasurer of the Chicago chapter of the American Institute of Architects. William Holabird, Henry Balfanz, Cecil W. Friedman, E. K. Collison and Early J. McMahon have been nominated vice presidents; Harry H. Salk treasurer and Paul D. Angell secretary, the latter for the eleventh consecutive year.

NEED IMPROVED INSTRUMENTS

Meters and Automatic Control Equipment Capable of Measuring Properties to Be Discovered

Instruments capable of measuring and controlling temperatures vastly higher than any now in industrial use will have to be provided in the future by the fast-growing industrial instruments business, E. G. Bailey, President of The American Society of Mechanical Engineers, said in an address at the Society's 69th Annual Meeting. Also they will be called on to measure properties or functions of materials and forms of energy "beyond any now within our realm of knowledge, or even speculation," he said.

Mr. Bailey, Vice President of The Babcock and Wilcox Co., New York, and also founder and President of the Bailey Meter Co., Cleveland, spoke at a luncheon of the industrial instruments and regulators division of the society.

The industries which depend most upon instruments, meters and automatic control are those of power generation, the chemical processes, and aviation. Illustrating the widely expanding use of such equipment, he said the industry was meager at the turn of the century, produced about 20 million dollars' worth of equipment in 1920; and now it approximates an annual rate of 240 million dollars.

Such instruments are used in the processing of many billions of dollars worth of material in the chemical and allied industries; and increase the efficiency of combustion of several billion dollars worth of fuel in the power and other industries, besides the savings in labor, Mr. Bailey said.

Electric generating units of 150,000 kw. are now under complete automatic control. In blast furnaces, smelters, heat treating furnaces and rolling mills, the metallurgical industry is using instruments "to increase production, decrease fuel consumption and improve the quality of the product." Instruments and automatic controls are used in the production of rubber, rayon, nylon, alkalis and many other products.

The scientific instrument and equipment industry was cited as a "vital war potential" in a report of the Scientific Apparatus Makers of America to the War Munitions Board. Instruments were used on the atomic bombs, for radar and sonar, variable time fuses, high-octane gasoline, blood plasma.

Outlining a program for improvement and development in the instrumentation field, Mr. Bailey stressed especially the aviation need for instruments designed for easier reading and accurate interpretation by the pilot.

Meet Unknown

"This industry is in a very strategic and enviable position," the speaker declared. "It will hold an increasingly important position in more complicated processes yet to come."

Trends of today point the way, he said, continuing:

"We will certainly have problems of measuring temperatures considerably higher than those of today. Not only will the temperatures of steam and other process fluids be carried higher than those now in use, but temperatures from the combustion of fuels will undoubtedly be above those now considered usable, by several hundred degrees. There will be a real problem to measure these temperatures with the products of combustion and impurities carried therein.

"In addition to continued use for measuring the flow of gases and liquids, we will probably need to measure the flow of mixture of both, and also an admixture of solids in suspension.

"There will be a greater need for instrumentation applied to the chemical and physical analysis of materials in streams of flow, and from such measurements, control the composition. We will probably be called upon to measure and communicate properties or functions of materials and forms of energy beyond any now within our realm of knowledge, or even speculation."

Publication of a completely new digest of house trailer laws by the National Highway Users Conference was recently announced by Director Arthur C. Butler. Titled "State Motor Vehicle Laws Affecting House Trailers," the booklet is available by writing to the Conference at 938 National Press Building, Washington 4, D. C.

The survey shows trailer coach owners exactly what registration, taxation, equipment, size, speed and license requirements must be met in each state this year.

It covers all present state laws and taxes affecting ownership and use of trailer coaches as vehicles upon the highway, and contains the model safety equipment requirements recommended by American Association of Motor Vehicle Administrators.

The 22-page law booklet was prepared in response to hundreds of requests from trailer travelers for information on state restrictions upon their mobile type of living, and is obtainable at its cost of one dollar per copy.

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ANALYSES REPORTS APPRAISALS

Bureau of Mines Producing Films On Resources

With the further financial assistance of American industry, the U. S. Bureau of Mines this year has extended its comprehensive production of sound-color motion picture films to depicting natural resources development in various states.

In the preparation of these films, the Bureau also is receiving full cooperation from the state governors concerned, from members of Congress, and from state and civic organizations.

Natural resources films already have been completed for the states of Texas, Oklahoma, California and Ohio. In process of preparation are others similar in character, for Oregon, Washington, Nevada and Wyoming, with a new version film for Arizona.

Industry Appropriation

Reels relating to the nation's mineral and allied industries have been produced by the Bureau of Mines for more than quarter of a century. This enterprise was facilitated by industry appropriations approximating $3.5 million. To enable extension of the undertaking to the field of natural resources within the states, industry appropriations in excess of $600,000 were made between Jan. 1 and Sept. 30 of this year.

In the Bureau's library are some 13,000 reels which are loaned—free of charge except for transportation costs—to educational institutions, industries conducting training courses, chambers of commerce, civic, military, engineering and scientific societies, business associations and other organizations. During the past fiscal year, these films were shown on 133,000 occasions to an attendance of some 10,000,000 persons.

Complete Library

In the preparation of the Bureau films, American industries have defrayed all expenses incident to the production of a subject and providing copies for government distribution. The main distribution center for the films is the Bureau of Mines Experiment Station, 4800 Forbes Street, Pittsburgh 13, Pa., where a complete library of all pictures listed is maintained.

Geological Survey Begins

COAL RESERVE ESTIMATE

A completely new and detailed estimate of the coal reserves of the United States is being made by the U. S. Geological Survey, Department of the Interior, Paul Averitt of that agency disclosed in an address at the Fuels Conference. Pointing out the need for such a survey of the nation's resources, Mr. Averitt said it will require about 10 years for completion of the project, though much specific information will be available meanwhile.

"The coal fields of the United States are large in all dimensions," said the speaker. "They cover roughly 350,000 square miles, or approximately one-ninth of the total area of the United States. The coal-bearing rocks commonly are several thousand feet thick, and, as in West Virginia, contain as many as 117 named and correlated coal beds. An estimate of the coal reserves in this great volume of rock is an expensive and time-consuming job."

Currently used figures on U. S. coal reserves were last revised in 1928, and only minor changes have been made since, Mr. Averitt pointed out. Though substantial revision of these figures was deemed necessary, lack of funds in the years following precluded the work, he said.

Field Mapping

Detailed field mapping includes information on areas of outcrop of coal beds, their range in thickness, nature of roof rock, amount of overburden, that is the thickness of rock overlying the coal, correlation of the beds, stratigraphy and structure of the coal-bearing rocks, and the preparation of coal reserve figures based on these data. Mr. Averitt declared:

"A reserve statement is of little value unless a considerable amount of data about how limits of coal are established at depth, minimum thickness of coal considered, weight of coal assumed, and similar factors are provided to show how the estimate was prepared. I am surprised at the number of estimates that do not give this information in full, and at the number of writers and speakers on the subject who attempt to compare estimates made on entirely different bases."

In order to obtain and present its data on coal reserves to the greatest benefit of the industry, the Survey is working closely with coal resources committees of The American Institute of Mining and Metallurgical Engineers, the National Bituminous Coal Advisory Council and the Bureau of Mines.

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An age is known by its tools. On that basis the atomic age is here. The Geiger counter, heretofore a hand-made device put together by the physicist interested in studying cosmic radiation or searching for misplaced radium, is being readied for mass production. Developments are under way at Westinghouse Electric Corporation that will lead to economical precision manufacturing of tubes, instruments, and power supplies for Geiger counters by the tens of thousands, like components of radio receivers.

The growing availability of man-made isotopes has created a need for nuclear-radiation counters for medical research, for tracer studies, and for process control in industry. In university and atomic-energy research laboratories these counters will become as common as voltmeters. Should atomic energy be developed for industrial uses, radiation detection in many forms will be required for personnel protection.

Warfare Considered

A closer and grimmer need is that of the military forces as they take the possibility of atomic warfare into account. If this country should be attacked by any one of many conceivable weapons—atomic-energy bombs, radioactive dust, or an infiltration of radiation-poison packages, large quantities of detectors would be required throughout highly populated areas. It is a dour thought—but a radiation detector may be standard equipment for the civilian-defense crewman of the future.

One of the representative new types built by Westinghouse is a cylinder of chrome steel about an inch in diameter and six inches long, through which a heavy wire extends from a glass insulator at one end down the center of the tube to almost the far end. This wire is covered by a wafer of mica that must be only one half of one thousandth of an inch thick. One critical feature of the tube is the gas within it. A precisely controlled mixture of neon, argon, and an exact trace of chlorine, at something less than atmospheric pressure, has proved ideal. The chlorine, a chemically active gas and difficult to control, is essential. Its function is to hasten deionization after each "count" before another beta particle or gamma ray enters. The central wire is maintained positive while the metal cylinder is negative. A beta particle (electron) or gamma ray entering through the mica window ionizes some of the gas, causing a discharge between wire and wall. This discharge is registered as a click on an audible-type instrument or by a needle if visual indication is desired. The sensitivity of the tube and circuit is astonishing.

Radiation detectors require new meters. One recently developed and now being manufactured has four scales of sensitivity, each with an appropriate color band, indicating intensities of radiation as to safe, mild, or hazardous. The emphasis has been to provide meters with adequate sensitivity and maximum reliability, sturdiness, and compactness. Fortunately one of the basic instrument mechanisms developed to meet the severe requirements of World War II could be adapted. The development was thus to adopt this mechanism in a complete instrument to fit in with the many other components, and at the same time provide the means for operation and use of the overall detecting device. Radiac instruments (as radiation detection equipment is now called) will appear in various forms, from large units, for bringing indications from remote places to a central point, to outfits that a man can carry with ease. Use of the tiny high-voltage batteries, tubes, and other components as developed for hearing aids and similar sets requiring the utmost in small size will help hold the total weight of the portable unit to not over ten pounds.

General Clay New Honorary Member Of Civil Engineers

General Lucius D. Clay, commander-in-chief of American Forces in Europe and military governor of the U. S. Zone in Germany, is among five eminent engineers who have been elected to Honorary Membership, its highest award, by the American Society of Civil Engineers.

This was announced by Col. William N. Carey, Executive Secretary of the 96-year-old Society, oldest national engineering organization in the country, following elevation of the five Society members by the Board of Direction. Others who received the awards at appropriate ceremonies opening the Society's annual meeting in the Hotel Commodore, New York, January 19, are:

Charles H. Buford, Chicago, President of the Chicago, Milwaukee, St. Paul and Pacific Railroad, an authority in the field of railroad operation and railroad engineering economics.

Professor Donald Derickson, New Orleans, retired head of Tulane University's Civil Engineering School, author of college texts and prominent in the field of engineering education.

Gano Dunn, President of the J. G. White Engineering Corporation, New York, widely known engineer and industrialist and recipient of various honors, including the Edison Medal, the Hoover Medal and the Egleston Medal of Columbia University.

Andrew Weiss, Mexico City, consulting engineer for the Mexican National Commission of Irrigation, prominent in the development of reclamation engineering in Mexico.

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YALE ENGINEER DISCUSSES

Atomic Age Building Problems

Modern buildings can be constructed to "resist" atomic bombs but human beings must go "underground" to be safe. "It is true that structures can be designed which will remain standing after an atomic bomb explosion. No matter how carefully such buildings are constructed, however, it would not be safe for the occupants to remain in them during an attack," according to Charles T. G. Looney.

Loss of life, Mr. Looney asserted, could be "greatly lessened" by well-constructed underground shelters, well placed for efficient access. "It is obvious that well-planned civilian defense in all its aspects would be essential," he said.

Mr. Looney, Associate Professor of Civil Engineering at Yale University, discussed the building problems posed by the atomic age on the weekly radio program "Yale Interprets the News," over Station WTIC.

Based on U. S. Survey

The Yale civil engineering expert based his observations on reports of the U. S. Strategic Bombing Survey on the bombing of Nagasaki and Hiroshima. He pointed out that the Japanese had been completely surprised and unprotected, but that some in Nagasaki survived the blast in underground shelters.

"This shows that a sufficient number of adequate shelters will protect lives, assuming that an advance warning system is in effect so that the shelters can be reached," he stated. Stocks of medical supplies in outlying communities would provide medical aid immediately after the blast, transportation and power transmission facilities near the disaster scene could immediately be used to help the stricken area.

Mr. Looney mentioned heat, blast or pressure, and radiation as the three atomic energies that must be studied for future building. He illustrated the difficulty of building with figures from the Japanese bombings. The heat was sufficient to char telephone poles 10,000 feet from the center of the explosion and the blast pressure has been estimated at 225 times that of a ten-ton block buster. Radiation must also be considered in modern construction.

The only buildings that remained standing were constructed of reinforced concrete. Modern steel structures could be built to resist atom bombs; however, even the reinforced concrete buildings at Hiroshima were damaged by the blast and almost completely gutted by fire.

Non-inflammable materials would have to be used inside buildings because even structurally intact buildings can be gutted by fire. "Nothing can be done about the contents except to provide a sprinkler system to put out the fire and to design the structure so that fire will not spread from floor to floor. Windows would have to be eliminated to prevent the radiant heat from the bomb from entering the building and also to eliminate the danger of flying glass," he declared.

Earthquake resistant construction, such as that on the west coast, was not structurally damaged at Hiroshima. For industrial buildings, the use of a skeleton framework of steel or reinforced concrete with a light covering material for the walls and roof might be used. Blast pressure would blow away the covering but would leave the frame intact so that it could easily be recovered.

Buildings in this country "are in general better constructed than those in Japan, but the only buildings that have any chance are modern steel or reinforced concrete ones," he declared, adding that only two per cent of the construction in our cities is made of the resistant materials.

In summary, Mr. Looney declared: "Our towns and cities, as built, are mostly of wood and brick construction and these buildings would therefore be destroyed by an atom bomb. In view of the impossibility of tearing down and rebuilding our cities it seems finally, that it is in building shelters and constructing bomb-proof hospitals and other structures for emergency services, that our engineering knowledge and our efforts would be most effectively used."

Announce Officers

Officers of the Midwest Research Institute announced the appointment of Dr. George E. Ziegler as Director and Dr. Clayton O. Dohrenwend as Assistant Director of the Institute. The announcement followed action taken at the Annual Trustees' Meeting held December 6, 1948, in Kansas City, Missouri.

Dr. Ziegler has devoted the past ten years to solving the problems of industry through the practical application of the fundamental sciences. He came to the Institute at the time of its inception in 1945 as Executive Scientist, having previously been associated with Armour Research Foundation in Chicago. He has been acting chief administrator of the Institute since the resignation of Harold Vagtborg some six months ago.

Dr. Ziegler received his Ph.D. from the University of Chicago and took additional post doctorate studies at Massachusetts Institute of Technology. He is known in scientific circles for his experimental X-ray diffraction studies and has numerous publications and patents to his credit.

Dr. Dohrenwend, appointed to the newly established position of Assistant Director, has been Research Consultant since coming to the Institute in July, 1946. He was formerly associated with Illinois Institute of Technology as Director of the Mechanics Department.

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Fuels Speaker Describes

SYNTHETIC FUEL PLANS

A program for the production of one million barrels daily of synthetic oils from coal was outlined by J. D. Doherty, Assistant Chief of the Office of Synthetic Liquid Fuels, Bureau of Mines, at the 11th Annual Fuels Conference of The American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers in November.

Describing work in research and development already under way by the Bureau of Mines and others in the production of synthetic liquid fuels, Mr. Doherty called for prompt erection of at least some commercial plants because "synthetic liquid fuels are not going to do us very much good in an emergency if we have to start from scratch."

Based on estimates of the Bureau of Mines, the program calls for a total investment of 8.7 billion dollars, including plants, mines and product pipe lines.

The million barrels per day of oil-from-coal would consist of the following products: liquefied propane and butane (L.P.G.) 86,000 barrels; high grade motor gasoline, 648,000 barrels; Diesel and furnace oil, 266,000 barrels. Heavy fuel oil, which could be obtained more cheaply from shale, was not included. Aviation fuel requirements, "which would skyrocket in the event of a national emergency," could readily be produced by coal hydrogenation, one of the two principal processes employed, the speaker said.

The cost of production, per gallon of total products, would be 12.4 cents, or 12.6 cents, depending on the process used.

Even though geological estimates of coal reserves are constantly being revised, "no reasonable revision could alter the conclusion that coal is our outstanding fuel reserve and that coal can furnish oil at present rates of consumption—2 million barrels per year—for centuries to come," Mr. Doherty declared. "Moreover, the day when synthetic oil from coal will begin to supplement our petroleum supplies does not appear to be far off."

Estimated liquid fuels resources of the United States are as follows: Coal and lignite, 87 per cent or 2,600 billion barrels; oil shale, 9 per cent or 270 billion barrels; petroleum and natural gas liquids, 2.9 per cent or 86 billion barrels; natural gas, 1.6 per cent or 48 billion barrels.

Domestic production of crude oil cannot be expected to meet future demands. Alternatives to a synthetic supply, which are the curtailment of oil consumption, and increasing oil imports, are expedients for the immediate future but will not solve the long range problem, said the speaker.

"Although synthetic fuels cannot relieve any oil shortages that might develop within the next year or two, an immediate start toward a substantial synthetics industry to supplement petroleum could help relieve shortages several years hence. By assuring ample future supplies, such a start would permit sound planning by industries dependent upon oil and maintain or restore the confidence of prospective customers for oil-consuming equipment."

About half of the production would be from coal east of the Mississippi River and half from coal and lignite west of the Mississippi. The requirement would be 575,000 tons per calendar day. This would amount to 210 million tons per year, a 34 per cent increase over 1947 production. Of this consumption, 213,000 tons per day would be bituminous coal from the East; 362,000 tons would be coal and lignite mined in the West.

In the western section, most of the coal would have to be obtained by opening new mines. In the East, existing coal mining capacity could produce most of the coal required by additional operating days and by continued mechanization.

In general the oil would be produced about equally by the gas synthesis (Fischer-Tropsch) method which was developed in Germany and modified and improved in this country; and the coal hydrogenation process.

"To produce the proposed 1 million barrels per day from coal and lignite would require a total investment of 8.7 billion dollars," Mr Doherty stated. "This is a tremendous amount of money, but it can be compared with the capital investment of 7.5 billion dollars that the petroleum industry anticipated would be spent on domestic production, transportation, refining, and marketing facilities in the five years from 1947 to 1951 chiefly to maintain present production rates."

The steel required is estimated at 6,300,000 tons with peak requirement five or six years after starting the program. The operating force would be 160,000 men including all miners.

The Bureau of Mines has under way research and development work in both the principal processes. Extensive work is being carried on by most of the leading oil companies and other industrial firms, particularly on the gas synthesis process.

All synthesis gas produced commercially from coal in this country has been obtained to date by gasifying byproduct coke. Since coking coals are relatively scarce, one of the major problems for which a solution is sought is to find a means of directly gasifying coal rather than first coking it and then gasifying the coke.

This problem is being attacked by the Bureau of Mines in laboratories, and pilot plants at Morgantown, W. Va.; Pittsburgh, Pa.; Louisiana, Mo.; Grand Forks, North Dakota; and Gorgas, Alabama. Battelle Memorial Institute and the Anthracite Institute Laboratories also are working on this problem.

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Welding Foundation Sponsoring Award On Bridge Design

Foreseeing a tremendously expanded application of welded design to bridge construction, the Trustees of The James F. Lincoln Arc Welding Foundation are sponsoring a new award program to advance the progress of welded bridge design.

The "Welded Bridges of the Future" Award Program offers awards to bridge or structural engineers for the best designs of a specified, welded highway bridge. The first award is $3,000; the second award $1,500; third award $750. In addition to the awards for the three best designs there will also be ten honorable mention awards of $100 each for the next best designs.

The competition opened January 1, 1949 and closes June 30, 1949. Any engineer or designer who feels himself qualified to enter the Program is eligible for participation.

The bridge to be designed is a two-lane deck highway bridge supported on two end piers 120 feet apart. The bridge is to be designed for ASTM-A7-46 steel and for H20-44 loading. While the size, steel and loading for the bridge are specified, other than these specifications —the designer is completely free to exercise his ingenuity. If he wishes, the designer may conceive and use new structural shapes not now available, providing only that the new shape or shapes can be readily produced if and when a demand for them develops. Moreover, he may assume availability of fabricating facilities other than those now in existence.

Complete details of the Rules and Conditions of the Program are available in a printed brochure which can be secured upon application from The James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio.

Thomas J. Deegan, Jr., was elected president of the Federation of Railway Progress. He succeeds William C. MacMillen, Jr. Deegan, who is Director of Public Relations of the Chesapeake and Ohio Railway, has been assistant to Robert R. Young, Chairman.

Develop Tiny Neutron Counter

A tiny atom-smashing machine, no larger than a flower pot, has been developed by the Westinghouse Electric Corporation to detect and count neutrons, the vital building blocks in the structure of matter.

The "neutron counter" was developed jointly by Dr. William E. Shoupp, manager of nuclear physics and electronics at the Westinghouse Research Laboratories and Dr. Kuan-Han Sun, Chinese-born research physicist.

Neutrons defy all ordinary methods of detection and study since they carry no electrical charge and cannot be detected directly by electrical means. The Westinghouse scientists took advantage of the atom-splitting qualities of the neutrons to devise a method for trapping them. In the "neutron counter" a very small amount of uranium 235 is mixed with a special light-producing phosphor. The mixture is coated on the surface of a photo-electronic tube. The whole device is contained within a metal cylinder which itself is lined with a two-inch thick wall of paraffin to "slow down" fast-moving neutrons. When a neutron passes through the paraffin shield and strikes the uranium-phosphor film on the tube, it splits the uranium atom or atoms. In the tiny explosion which takes place, nuclear fragments are hurled off and strike the phosphors producing light rays. These light rays hit a photo-sensitive plate to produce electrons which then are multiplied a millionfold and collected at the end of the tube.

Thus neutrons are recorded as flashing peaks of light on a fluorescent screen and can be observed directly or the electric impulses can be transmitted to electronic circuits that give an accurate count of the atomic explosions taking place. The new detector also can count the particles cast off by the exploding atoms at the rate of 100,000 a second—50 times faster than the standard Geiger counter.

Seed Packages for Europe

Two CARE seed packages containing potential vast harvests of food for humans and fodder for livestock in Europe are announced by Executive Director, Paul Comly French.

Thirty-one selected varieties of vegetable seeds, enough to plant a garden up to 50 by 150 feet, are contained in the package designed for family use. The other, weighing 20 pounds, holds enough hybrid field corn seed to plant 2½ acres and provide valuable feed for fattening meat animals or maintaining a high level of production in dairy cattle.

The new CARE packages are being offered for $4 each, and orders are now being received by CARE at 50 Broad Street, New York 4, N. Y., as well as at all CARE offices throughout the country, for guaranteed delivery in eleven European countries. Orders should be sent at the earliest possible date to insure delivery in time for the planting seasons.

"This latest expansion of CARE's service, supplementing our $10 food and clothing textile packages," Mr. French said, "comes in response to many appeals both here and abroad. It has been pointed out that since Europe's recovery depends upon its ability to produce for itself, anything Americans can do to provide the means of production will speed the recovery. These seed packages sent now, will go a long way toward solving Europe's food problems next year."

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Engineering Magazine Cites

SHORTAGE OF BRICKLAYERS

Bricklayers, the elite of the construction trades, belong to a sick craft that is a drag on building progress and a threat to its own future.

This is the conclusion reached by ENGINEERING NEWS-RECORD in an article deploring the scarcity and costliness of bricklayers, and offering as a solution "transfusions, in the form of more apprentices."

The article says that most bricklayer apprenticeships run three or four years; now, three years after V-J day, there should be 5,000 to 10,000 apprentices in training merely for a replacement rate that will stabilize the bricklayer supply, let alone fill out today's shortage.

Enrollment Decreasing

"The Structural Clay Products Institute, spokesman for the brick manufacturers," says the article, "places the shortage at 40,000. Since the war, the number of bricklayer apprentices under Department of Labor Joint Apprenticeship Committee auspices has increased to 12,000, but the rate of enrollment now is decreasing, despite high bricklayer pay and vigorous cooperation by the bricklayer's international union and by contractors in most parts of the country."

(The national average bricklayer wage is $2.41 an hour, six cents higher than the next trade, plasterers.)

Two of the major factors cited as discouraging recruitment are the long apprenticeships and nepotism on the part of some local unions who have the final say-so on an applicant's eligibility.

"A Michigan contractor states that many boys do not sign indenture papers when they find it will be three years before they can obtain full pay," the article says. "Contractors in a southern, a far western and eastern city said unions discourage applicants for apprenticeship, making kinship with journeymen an important factor for admission."

Requirements Vary

It was explained, however, that requirements for apprenticeship vary among the different local unions.

As for the suggestion that the productivity of workers be increased, it was noted that plentiful jobs and aging craftsmen are not conducive factors to high productivity. It was explained that at one time slow deliveries of materials was given as one of the reasons for low productivity.

Another possible factor in individual bricklaying production was said to be union restrictions on bricklayer output.

"A dramatic attack on rumors and loose talk about restrictive regulations was made in Buffalo last month by a contractor and Local 45, Bricklayers Union (AFL)," the article continued. It added that in a two-page advertisement they jointly assailed the popular "misunderstanding" that bricklayers now are laying fewer bricks per day because of indifference, lack of skill or union rules. The union offered $1,000 for any proof that production was restricted.

Engineering News-Record uncovered no evidence of such restrictions.

S&C Electric Company, formerly Schweitzer & Conrad, Inc., announces the appointment of Lawrence M. Rudbeck as sales engineer for the Indiana, Western Kentucky, Southern Illinois territory, with headquarters at 310 Test Building, 54 Memorial Circle, Indianapolis 4. Mr. Rudbeck for a number of years was associated with Westinghouse Electric Corporation and with Allis-Chalmers Manufacturing Company. More recently he was a member of the firm of Hall and Rudbeck of Indianapolis.

Scientific Award

George R. Cowgill, Professor of Nutrition at Yale University, received the 1948 Scientific Award of the Grocery Manufacturers of America.

Mr. Cowgill became the 14th scientist to receive the honor. The first was Dr. Lafayette B. Mendel, of Yale, who supervised Mr. Cowgill's Ph.D. study and aided him in beginning the research which has brought Mr. Cowgill distinction.

The presentation took place during a luncheon at the organization's annual meeting in the Waldorf-Astoria Hotel. Mr. Cowgill was cited "In recognition of his fundamental contributions to the science of nutrition, particularly his research on the functional role of vitamin B_1, his success as a teacher of young biochemists and his outstanding editorial work for the Journal of Nutrition." The award was made by Charles W. Dunn, General Counsel of the Grocery Manufacturers of America.

Research Award

Vannevar Bush, retiring president of the Research and Development Board of the national military establishment, has been chosen to receive the 1949 Industrial Research Institute medal awarded for outstanding contribution to the field of industrial research.

The Institute, composed of one hundred and six companies representing diversified types of industry throughout the nation, cited Dr. Bush for his inspired leadership in the Office of Scientific Research and Development, in marshaling industrial and academic research and coordinating it with the military effort in the common defense, thus developing an instrument of government so effective as to provide a pattern for continued service. The medal will be presented February 3 during the winter meeting of the Institute at Rye, N. Y.

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WSE Excursions

Air Port Excursion

The Municipal Air Port excursion on January 15th, while of interest to members generally, aroused special enthusiasm among the members of the Communications Engineering Section. The party was divided into groups with guides for each and ample opportunity was offered throughout the trip for questions.

Everyone present was invited to inspect the cockpit of the DC-6, the large 54 passenger airliner. The United Air Lines Chicago Communications Center, one of Western Union Telegraph Company's latest and most modern installations, attracted particular interest, not alone because of the magnitude of the operations, but also because of the ease with which messages are received, dispatched, and forwarded to as many as thirty points at one time, entirely automatically. Those who missed the trip missed a rare opportunity to keep abreast of recent developments.

Future Excursions

The Excursion Committee, under Mr. Bowers, Chairman, is pleased to announce that an excursion to the Stevens Hotel has been arranged for Saturday afternoon, February 26, 1949.

The tour will show the complex operations of one of the country's great hotels.

Members and friends should meet in the main lobby of the hotel, 720 S. Michigan Ave., at 2 p.m.

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ARE YOU INTERESTED IN REFRESHER COURSES?

The Western Society of Engineers, together with the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and the American Institute of Mining and Metallurgical Engineers, is considering pre-examination refresher courses of approximately fifteen weeks duration for engineers qualified to apply for a license under the Illinois Professional Engineering Act. if there appears to be sufficient interest.

Other members of the engineering profession may desire to take such studies in order to refresh themselves on specific engineering subjects.

It is proposed that the best instructors available will design and teach the courses, which will receive the approval of leading engineers in the profession.

A nominal charge sufficient to cover necessary expenses will be made, and classes will probably be held in the new headquarters of Western Society of Engineers.

Professional engineers who are interested are asked to write to Donald V. Steger, Executive Secretary of Western Society of Engineers, 84 E. Randolph Street, Chicago.

Mr. Donald V. Steger
Executive Secretary
Western Society of Engineers
84 E. Randolph St.
Chicago, Illinois

Dear Sir:

I am interested in the pre-examination course for engineers. Please send me further information.

Name .....

Address .....

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John Lucian Savage To Receive Washington Award

John Lucian Savage, consulting civil engineer, has been elected the recipient of the Washington Award for the year 1948-49. The presentation will be made at a joint dinner meeting of the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Chemical Engineers, American Institute of Electrical Engineers, and Western Society of Engineers. The dinner will be given Wednesday evening, April 20, at the Furniture Club of America, 666 No. McClurg Court.

Further details will be announced in a future issue of MIDWEST ENGINEER.

WESTERN SOCIETY'S

Members' Open House Is February 18

Here's the date all members of Western Society have been awaiting. February 18—that's the day the new Headquarters will be open for inspection by WSE members, their friends and families.

From 3 p.m. until 10 p.m. there will be conducted tours through the three floors. Displays of the growth and progress of the Society are arranged. Refreshments, buffet dinner, entertainment and other features are just a few reasons why you should not miss this gala occasion.

A mere word picture of these facilities seems inadequate by way of introduction. The acoustically perfect ceilings, the loud speaker and public address system that is heard on all three floors, the furnishings, the layout of the floors—the thousand and one details which have gone into the planning to make your Headquarters the finest in Chicago—have to be seen to be appreciated.

Yes, February 18, 1949, is to be a memorable day in the annals of Western Society. You owe it to yourselves and friends and the Society to attend this great event. See what the Development and Headquarters Committees have accomplished, learn about the new plans for WSE, help the Membership Committee by bringing a guest.

Here are some highlights of the things you'll see.

As we told you in the NEWSLETTER of February 1, 1949, we went into full swing operations of our new Headquarters facilities February 7.

Large Meeting Room

The luxurious large meeting room on the seventh floor has been in use for over a month. Comfortable theatre type chairs seat 193 persons; the public address system permits a speaker to walk about the stage and to talk in a conversational tone — the "mike" is extremely sensitive; a fine new blackboard and motion picture screen are installed; the ventilating air ejector system is operating and the new podium, electric pointer and many other features make this room "tops" for convenience and full view seating and hearing arrangement.

Smaller Meeting Rooms

A smaller meeting room seating 100 persons is divided by a sliding door which absorbs distinct sounds from either room. These attractive doors may be folded back to provide accommodations for over 300 persons.

The small conference room is immediately adjacent to the small meeting room and may accommodate up to 25 people.

All windows have venetian blinds enabling the daytime exhibition of motion pictures or slides.

These features should be particularly advantageous to technical and professional groups desiring space for meetings in the evenings and business firms in need of space for meetings or conferences during the day.

The sixth floor houses the Society's general and editorial offices and the exquisitely appointed lounge. Here, members and their friends and families may enjoy a restful prelude before dinner, or meetings; meet their families or obtain their favorite cocktail at the beautifully designed, well stocked bar. The bar is open from 11 a.m. to 10 p.m.

Dining Room

The dining room and kitchen are located on the fifth floor. Complete with range, steam table, refrigerating units, automatic dish-water and other necessary equipment, the kitchen is to the rear of the dining room. The dining room itself will seat 135 persons. Tables, chairs, linens, silver, china and other accoutrements will equal the finest restaurant in Chicago.

Edmanson-Bock, outstanding Chicago caterers will supply all of the food and service both in the dining room and the bar. Sufficient personnel will be on hand at all times to assure prompt and efficient service under the resident managership of Mr. H. M. Frederiksen, who managed the Harbor View Restaurant at the Chicago Railroad Fair.

The dining room will be open from 11 a.m. to 8 p.m. five days a week Monday through Friday for service of luncheons and dinners. While reservations for large parties are desirable, meals will be served under a regular restaurant type of service, ordered from a daily menu. Service is on a cash basis and guest checks for signature will not be accepted.

Luncheon menus will start at 75c and dinners will be available from $1.25. These prices are well within competitive prices charged by other restaurants offering the same services in the neighborhood. Special luncheons and dinners for groups can be arranged in advance with a selected menu.

Parking Facilities

84 E. Randolph Street is close to I.C. Railroad, "L," streetcar and bus transportation. There are several privately owned parking lots on Wabash Avenue, Lake Street and Randolph Street. The Municipal Parking Lot at Monroe Street, just east of Michigan Boulevard has a convenient stairway leading to the Randolph Street viaduct at the north end of the lot.

SEE YOU FEBRUARY 18th!

WSE Calendar

Every Monday night is Western Society night at the new WSE headquarters, 84 E. Randolph Street. Members are urged to make it a must on their weekly schedules.

The meetings of all Sections and Divisions for the remainder of the year are as follows:

February 18	Members' Open House
February 21	General meeting
February 28	Communications Engineering Section
March 3	Junior Division
March 7	Gas, Fuels and Combustion Engineering Section
March 9	Professional Women's Council
March 14	General meeting sponsored by Bridge and Structural Engineering and Transportation Engineering Section
March 21	Chemical and Metallurgical Engineering Section
March 28	Mechanical Engineering Section
April 4	Hydraulic, Sanitary and Municipal Engineering
April 7	Junior Division
April 11	General Meeting sponsored by Chemical and Metallurgical Engineering and Gas, Fuels and Combusion Engineering Sections
April 13	Professional Women's Council
April 18	Traffic Engineering and City Planning Section
April 25	Transportation Engineering Section
May 2	Fire Protection and Safety Engineering Section
May 9	Junior Division, General Social Meeting
May 11	Professional Women's Council
June 6	Annual Meeting

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NECROLOGY

Charles J. LaMena

Charles J. LaMena, a Member since 1929, died December 20. He was a purchasing agent for the Mines Engineering Co.

During the war he was appointed assistant chief of the Production Engineering Branch, Chicago Area Office, of the U. S. Army Air Forces, and while in this position was instrumental in procuring several members for the Society.

Charles R. Salisbury

On September 10, Charles R. Salisbury, a Life Member since May, 1948, died in Chicago. Mr. Salisbury had been an active member in the Society and quite generous in his contributions to the Improvement Fund and the Headquarters Development Fund.

He had been structural engineer for the Bucyrus-Erie Co., Monighan Division, Chicago.

Robert J. Graf

Robert J. Graf, broker, and chairman of the Board of Directors of H. M. Byllesby and Company, died January 2 as a result of a heart attack. He had been a Member of the Society since 1919, and prominent in Chicago financial circles since 1902 when he came here with Col. H. M. Byllesby to found a brokerage firm.

Mr. Graf always maintained a keen interest in the growth of the Society and recently in the move to the new headquarters.

John C. Sanderson

The Society lost one of its older members when John C. Sanderson died at his home in Evanston, Ill., on November 15. He had been a Life Member since May, 1941, and his interest in the activities of the Society always was evident.

Mr. Sanderson was a retired member of Sargent & Lundy and served on the committee which drew up the building code for A Century of Progress.

Western Society Meetings

General Meeting, February 21

"Refuse Collection and Disposal in Chicago" will be the subject of the discussion to be given by Lloyd M. Johnson and Samuel A. Greeley on February 21, before the Western Society of Engineers. Mr. Johnson will outline present methods and costs of collection and disposal of refuse by the City and will discuss plans for the extension and improvement of these services. Mr. Greeley will discuss the present and proposed procedures in Chicago as related to practice elsewhere, with comment on local conditions affecting the problem.

Their appearance is being sponsored by the Sanitary and Municipal Section of Western Society, and the Sub-committee on Refuse Disposal of the Civic Committee.

Mr. Johnson, as Commissioner of Streets and Electricity, has had direct charge of refuse collection and disposal operations since 1941, a period during which these services have been substantially improved. He had previously held responsible positions in the engineering department of the Sanitary District of Chicago.

Mr. Greeley has been active in the engineering phases of municipal refuse problems since his connection with the construction and operation of the Milwaukee incinerator in 1909. As senior member of the firm of Greeley and Hansen, he has recently completed a study and report on a general plan for refuse collection and disposal in Chicago.

Junior Division, March 3

"The Role of the Engineer in Management Consulting" will be the subject of a talk by Stanley R. Perkins, senior staff engineer of Booz, Allen & Hamilton, management counsellors, before the Junior Division of the WSE at 7 p.m., March 3, in the Society headquarters.

Mr. Perkins will discuss ways in which engineers can assist management in solving the problems of a business. He will outline some of the basic principles of the science of management which his firm uses in its work.

During the period in which Mr. Perkins has been associated with Booz, Allen & Hamilton, he has been called upon to analyze the operations of firms producing such varied goods as gloves, ceramics, grey iron castings, and fine china.

Prior to assuming his present position Mr. Perkins was manager of the planning division of the McInerney Spring & Wire Co. For eight years he was associated with the U. S. Rubber Co. in various supervisory engineering capacities in their Mishawaka, Des Moines, and Milwaukee plants.

His education includes four years at Purdue University from which he received a degree in Mechanical Engineering, I.C.S. course in Industrial Management, and two years at the LaSalle School of Accounting.

A general discussion will follow Mr. Perkins' talk.

An informal get-together dinner will be held in the fifth floor Dining Room of the WSE before the meeting at 6 p.m. All members and friends of the WSE are invited to attend both the dinner and the meeting.

Communications, February 28

Frank Martindell and G. G. Keyes of the Teletype Corporation staff will speak at the February 28 meeting of the Communications Section on the subject "Words at Work," a nontechnical exposition of certain recent developments in Teletype equipment. The Sequential Selector, which is the most recent product of the Company in control devices, will be demonstrated. The other equipment used will be of the most up-to-date design and well worth examination by anyone not familiar with modern printing telegraph equipment.

Mr. Martindell graduated with a degree of M.E. from Cornell University in 1915, had extensive experience in ordnance manufacture during World War I and II. He was a member of the engineering staff of the Western Electric Company from 1926 to 1943 and has been with the Teletype Corporation since 1946. He is a member of the American Society of Tool Engineers and the Chicago Engineers Club.

Mr. Keyes has been engaged in the engineering and design of machine tools and allied equipment from 1930 to 1943. In 1943 he joined the engineering staff of the Teletype Corporation, and since then has been engaged in the engineering of telegraph equipment with emphasis on system engineering. He is a member of the Western Society of Engineers.

AIEE Educational Program

The A.I.E.E., Chicago Section, is sponsoring an Engineering Educational Program whereby members of all organizations of the Illinois Engineering Council are eligible to enroll in all classes at the member fee.

Courses scheduled for early spring are the following:

1. **FUNDAMENTALS AND CONCEPTS OF LAW**

   Especially as concerns the engineer. The Chicago Bar Association is actively interested in this course and will attempt to give the engineer a comprehensive survey of his legal problems. It is planned for 5 sessions, two hours each.

2. **THEORY AND PRACTICE OF CONDUCTING MEETINGS**

   This course is designed to present the basic principles and actual practices of Conference Management. It will explain the value of conferences, the advantages of training in conference management, the types of meetings and techniques. It is planned for 6 sessions, two hours each.

Further details will be available next month.

WSE Applications

In accordance with the By-laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Junior, Member, Associate, etc.

All applicants must meet the highest standards of character and professionalism in order to qualify for admission, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office.

Applications PRESENTED to the Board of Direction at its meeting January 27, 1949.

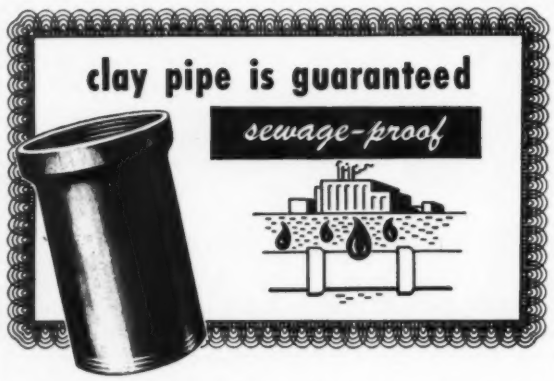
152-80 Harold F. Sommerschield, Struet'l Representative, Portland Cement Association, 33 W. Grand Ave.

153-80 Henry H. Korn, Methods Supervisor, Public Service Company of Northern Illinois, 72 W. Adams St.

154-80 Edwin J. Bacharz, 4858 S. Paulina St., attending Illinois Institute of Technology.

155-80 George R. Boddeker, 1804 N. Normandy Ave., attending Illinois Institute of Technology.

156-80 Charles F. Marner, 3927 Lexington St., attending Illinois Institute of Technology.



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157-80 William R. Smith, 9911 S. Green St., attending Illinois Institute of Technology.

158-80 Samuel Rand, 1555 Fargo Ave., attending Illinois Institute of Technology.

159-80 Charles J. Chapin, Sales Engr., F. W. Post Company, 3680 Avondale Ave.

160-80 James C. Spence, Jr., 10938 Bell Ave., attending Illinois Institute of Technology.

161-80 Herbert S. Levinson, 3907 N. Damen Ave., attending Illinois Institute of Technology.

162-80 Everett H. Mayo, 2709 S. Millard Ave., attending Illinois Institute of Technology.

163-80 George I. Crossman, Distribution Engr. (Gas), Pubblic Service Company of Northern Illinois, 1001 S. Taylor Ave., Oak Park, Ill.

164-80 Harold L. Root, Chief Estimator, A. J. Boynton & Co., 109 N. Wabash Ave.

165-80 Walter A. Ratcliff, Structural Engr., Holabird & Root & Burgee, 180 N. Wabash Ave.

166-80 Lee Schlesinger, 3057 W. Pierce Ave., attending Illinois Institute of Technology.

167-80 Everett Lauer, Jr., Switchman, Illinois Bell Telephone Co., 3532 N. Sheffield Ave.

168-80 Elmer J. Rohner, Engr., Illinois Bell Telephone Co., 208 W. Washington St.

169-80 W. E. Lukey, Asst. to Div. Vice Pres., Public Service Company of Northern Illinois, Box 278, Glencoe, Ill.

170-80 Donald W. McConachie, 1041 S. Grove Ave., Oak Park, Ill., attending Illinois Institute of Technology.

171-80 Rowland M. Davis, Supt., Sumner S. Sollitt & Co., 307 N. Michigan Ave.

172-80 Robert E. Kuston, 4843 W. Homer St., attending Illinois Institute of Technology.

173-80 Charles W. Thorson, 3551-A Gregory St., attending Illinois Institute of Technology.

174-80 Ernest W. Nordquist, 307 Nordica Ave., Glenview, Ill., attending Illinois Institute of Technology.

175-80 John Farquhar, 11209 Hermosa Ave., attending Illinois Institute of Technology.

176-80 John E. Halligan, Div. Plant Supt., Illinois Bell Telephone Co., 212 W. Washington St.

177-80 Austin G. Weber, Construction Engr., Territorial, The Texas Co., 332 S. Michigan Ave.

178-80 Wilbur H. Knobloch, 2050 W. 70th Pl., attending Illinois Institute of Technology.

179-80 Albert W. Foster, Junior Designer, The Armco International Corp., 109 N. Wabash Ave.

180-80 Rodney G. Dabe, Jr., 3815 Wrightwood Ave., attending Illinois Institute of Technology.

181-80 Donald H. Ward, 585 Prairie Ave., Glen Ellyn, Ill., attending Illinois Institute of Technology.

182-80 Frank J. Kornacker, Structural Engineer, 330 S. Wells St.

183-80 Edward Mauel, Chief Layout Engr., Great Lakes Carbon Corp., 333 N. Michigan Ave.

Book Reviews

On Subjects of Interest to Engineers

Engineering Applications of Fluid Mechanics

by J. C. Hunsaker and B. G. Rightmire. Published by McGraw-Hill Book Co., New York, 1947. 494 pp., $5.00

In this college textbook the authors do not give the traditional course in hydraulics, but a more fundamental treatment of the action of fluids generally. In this course is developed the mathematical reasoning as applied to machines such as pumps, compressors, and turbines, which actually handle fluids, and also to machines where controlled flow of air, fuel and combustion gases is essential.

Chapters are devoted to statics, kinematics, and continuity, dynamics of an ideal fluid, energy and momentum relations for steady flow, incompressible flow in closed conduits, compressibility phenomena, drag and wing theory as applied to airplanes, hydrodynamic and boundary lubrication, hydraulic turbines, pumps, fans, compressors, propellers and jets, fluid couplings, and torque converters, and hydraulic transmissions and controls.

The theory of dimensions and similitude is developed carefully, forming the basis of prediction of full-scale performance from tests of small scale models. This will assist in the solution of the complicated problems encountered by naval architects, aeronautical engineers, and others.

At the end of the book are 35 pages of problems, which will test the students' mastery of the subject matter.

H. F. W.
Member WSE

Applied Thermodynamics

by Virgil Moring Faries. Published by The MacMillan Company, New York City, in 1947. 480 pp., $4.75

This is the revised edition of the college textbook first issued in 1938. It is planned as a first course for a college credit of 4 to 8 semester hours.

The author develops in a neat and logical manner the usual energy equations for gases, the thermal cycles, and performance of internal combustion engines, compression and expansion of air, flow and mixture of gases, combustion and its products, liquids and vapors, steam power plants and turbines, refrigeration and transfer of heat.

Interest is added by means of cuts and descriptions of the various pieces of equipment, and with short biographical sketches of scientists and engineers who have been prominent in the development and application of thermodynamics.

Problems are not included in this book, since the author has published a separate book with about 1200 problems, and several reference tables and charts.

This is a very good textbook for students, and reference book for engineers.

H. F. W.
Member WSE

Klystron Tubes

by A. E. Harrison. Published by McGraw-Hill Book Co., New York, N. Y., 1947. 271 pp., $3.50

Klystrons are families of microwave vacuum tubes in which a periodic variation of the velocity of the electrons is converted into radio frequency energy by utilizing a transit time to produce electron bunching without appreciably varying the emission from the cathode. These tubes have been a vital factor in the development of radar and other ultra high frequency equipment.

The book is primarily a theoretical text but does devote several chapters to the operation of klystron tubes, power supply requirements and microwave techniques. An excellent short glossary is included along with design charts for the practical application of these tubes.

The present book, which is a first edition in the form of a comprehensive text, is a complete revision of earlier publications beginning in 1942. It gives a more extensive theoretical analysis of the operation of klystron tubes which necessitates an increase in the mathematical content of the book, however, practical interpretations of the equations in the theoretical chapters are given so that an understanding of these principles may be obtained without following the mathematics in detail.

Acknowledgment is given for assistance rendered by the tube-development group of the Sperry Gyroscope Company and many prominent scientists. Those interested in this general subject will find the information authentic, satisfying in scope and accompanied with excellent diagrams and illustrations.

J. A. S.
Member WSE

Hydraulics

by Horace W. King, Chester O. Wisler, and James G. Woodburn. Published by John Wiley and Sons, Inc., New York City in 1948. 351 pp., $4.00

This is the fifth edition of the textbook for beginning courses in hydraulics, first issued in 1922.

The subject matter deals preponderantly with liquids, and covers pressure, equilibrium, flow fundamentals, orifices, tubes, weirs, and flow in pipes, pipe networks, and open channels. In one chapter are derived fundamental formulae relating to jets and vanes, as used in the design of impulse turbines.

The last chapter is devoted to hydraulic similitude and dimensional analysis, developing basic principles and methods of analysis as they relate to hydraulic model testing.

Some 500 comprehensive problems, with answers to the most of them, test the student's mastery of the subject matter.

H. F. W.
Member WSE

Engineering Societies Personnel Service

84 East Randolph St., Chicago 1, Ill., ST ate 2—2748

These items are from information furnished by the Engineering Societies Personnel Service, Inc., Chicago. This SERVICE, operated on a co-operative, non-profit basis, is sponsored by the Western Society of Engineers and the national societies of Civil, Electrical, Mechanical and Mining and Metallurgical Engineers. Apply to ESPS, Chicago and the key number indicated, including postage to cover forwarding and return of application. If placed in a position as a result of a Men Available or Position Available advertisement, applicants agree to pay the established placement fee. These rates are available on request and are sufficient to maintain an effective non-profit personnel service. Prepared MEN AVAILABLE advertisements limited to 35 words, with typed resume attached may be submitted to ESPS Chicago by members of Western Society of Engineers at no charge. A weekly bulletin of positions open is available to subscribers. Apply ESPS Chicago.

MEN AVAILABLE

OFFICE ENGINEER, M.E., 38; 15 yrs. exp. mechanical and civil engineering. Specifications for plant equipment and construction; purchasing and contract negotiations, expediting, reports; structural design; plant layout; checker on boiler shop-erection drawings; mechanical drafting; engineering teaching; public speaking; correspondent. Chicago area. 32-(a) W

CHIEF, ASST. CHIEF ENGINEER, licensed, M.E., 20 years' experience consultant, specification, layout and installation of foundry, material handling and railroad shop equipment. Survey, cost estimates, field construction of steel structures and cranes. Design, modernization and mechanization. Knowledge of electrical and concrete work. Illinois or Midwest. 32-W

FIELD OR DESIGN ENGINEER (CONSTRUCTION) C.E., 6 years' experience structural engineer and designer. Worked on monorails, bridge cranes, hoists, foundations, buildings, gas and oil service and facilities. Specifications and contracts. Knowledge of air field and water supply. Chicago or Rocky Mtn. area. 33-W

DESIGNER-DEVELOPMENT ENGINEER, M.E., 34, 8 years' experience design, development steel handling, precision gears, hydraulic and mechanical power presses (50-2000 tons). Prefer heavy machine tool. Outside Chicago. 34-W

POWER PLANT ENGINEER, M.E., M.S., 20 years' experience responsible charge plant design, operation, maintenance, budgeting, construction, installation and rebuilding of small, medium and large-low, medium and high pressure boiler, steam power, electric, refrigeration, water supply and treatment. Locate anywhere. 35-W

RECENT GRADUATE, C.E., HONOR SOCIETY, prefers structural design or level and transit in field. Locate U.S.A. 36-W

RECENT GRADUATE, M.E. & IND. ENGR., DEANS LIST, prefers time study, methods or industrial. Some metal and printing experience. Locate anywhere. 37-W

DESIGNERS, DRAFTSMEN, DETAILERS, CHECKERS, (mech. civil, elec. mining) recent grad. 30 yrs. exp.; consultants, constructors, industrials, on structures, equipment, devices, machines and supplies. $3000-8500. 38-W

ESTIMATORS, (mech. civil, elec.) several yrs. to extensive experience, construction, engineering, industrial and manufacturing on structural, commercial and industrial projects. $3600-6000. 39-W

SPECIFICATION WRITERS, (mech.) experienced on machinery. $5000-6000. 40-W

CONSTRUCTION SUPERINTENDENT, PROJECT ENGINEER. 5-35 yrs. exp., construction, heavy, medium and light; industrial, commercial, airfield, pipe line, power house, utilities, water front. $5000-12000. 41-W

JUNIOR CONSTRUCTION ASSIST. and OFFICE ENGINEERS, recent grads., 10 yrs. exp. construction, $3000-6000. 42-W

FACTORY, PLANT MANAGERS, or SUPERINTENDENTS, 10-30 yrs. exp., line and staff, complete operation, light, medium, heavy production of equipment, machinery, products and materials; methods, process, maintenance, planning, scheduling, control, layout, tooling, management and industrial engineering. $6000-15000. 43-W

CHIEF, PROJECT AND PRODUCT ENGINEERS, 5-25 yrs. exp., complete engineering and shop operation, design, develop, research, test and produce light-heavy machinery, materials, equipment & products; controls, schedules, plans, tool, management. $5500-10000. 44-W

PRODUCTION ENGINEERS, 2-20 yrs. exp., shop or plant plan, schedule, control and layout, light-heavy manufacturing and processing of machines, products, devices and equipment. $3600-5500. 45-W

POSITIONS AVAILABLE

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R-5427 ASSISTANT SALES PROMOTION 28-35; some practical experience, farm background, especially dairy helpful, assist in sales stimulation. Familiar with copy, art, and advertising. Assist on catalogs and photographic. Assist on packaging and instruction sheets; contact and address dealers, distributors and salesmen; publish house organ, price list and bulletins. $3000 and up. Small town N W Chicago. Travel 10 to 15%.

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Hortonspheres are recommended for the storage of anhydrous ammonia, butane-propane mixtures, volatile grades of natural gasoline and volatile refinery charging stocks. They are also used to store natural gas, manufactured gas, hydrogen and other gases.

Hortonspheres are built in capacities of 1,000 to 25,000 bbls. for pressures from 30 to 150 lbs. per sq. in.

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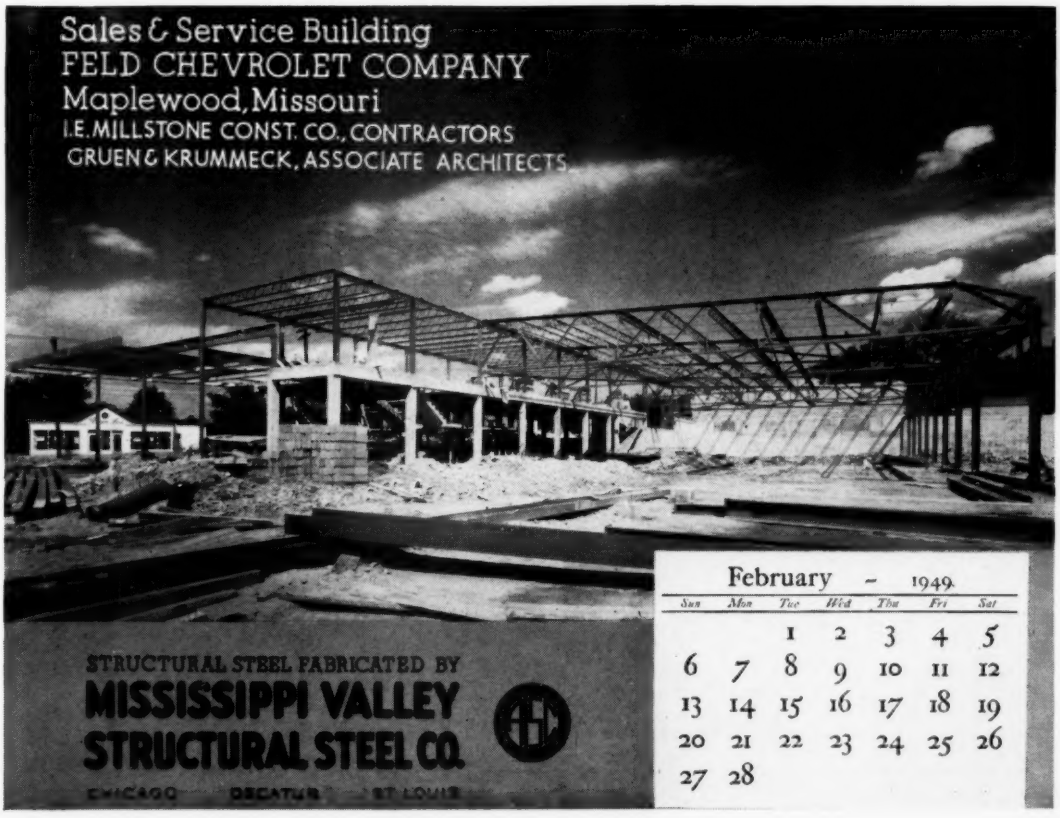
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